

SPECIFIC GUIDELINES FOR ASSESSMENT OF *INERT, INORGANIC GEOLOGICAL MATERIAL*

1 INTRODUCTION

1.1 The Guidelines for the Assessment of Wastes or Other Matter that May be Considered for Dumping¹, referred to in short as the “Generic Guidelines”, as well as the Specific Guidelines for Assessment of Inert, Inorganic Geological Material addressed in this document 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 Convention 1972 or the 1996 Protocol thereto. Annex 2 to the 1996 Protocol places emphasis on progressively reducing the need to use the sea for dumping of wastes. Furthermore, it recognizes that avoidance of pollution demands rigorous controls on the emission and dispersion of contaminating substances and the use of scientifically based procedures for selecting appropriate options for waste disposal. When applying these Guidelines uncertainties in relation to assessments of impacts on the marine environment will need to be considered and a precautionary approach applied in addressing these uncertainties. They should be applied with a view that acceptance of dumping under certain circumstances does not remove the obligation to make further attempts to reduce the necessity for dumping.

1.2 The 1996 Protocol to the London Convention 1972 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 1972 prohibits the dumping of certain wastes and 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 1972, 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 1972.

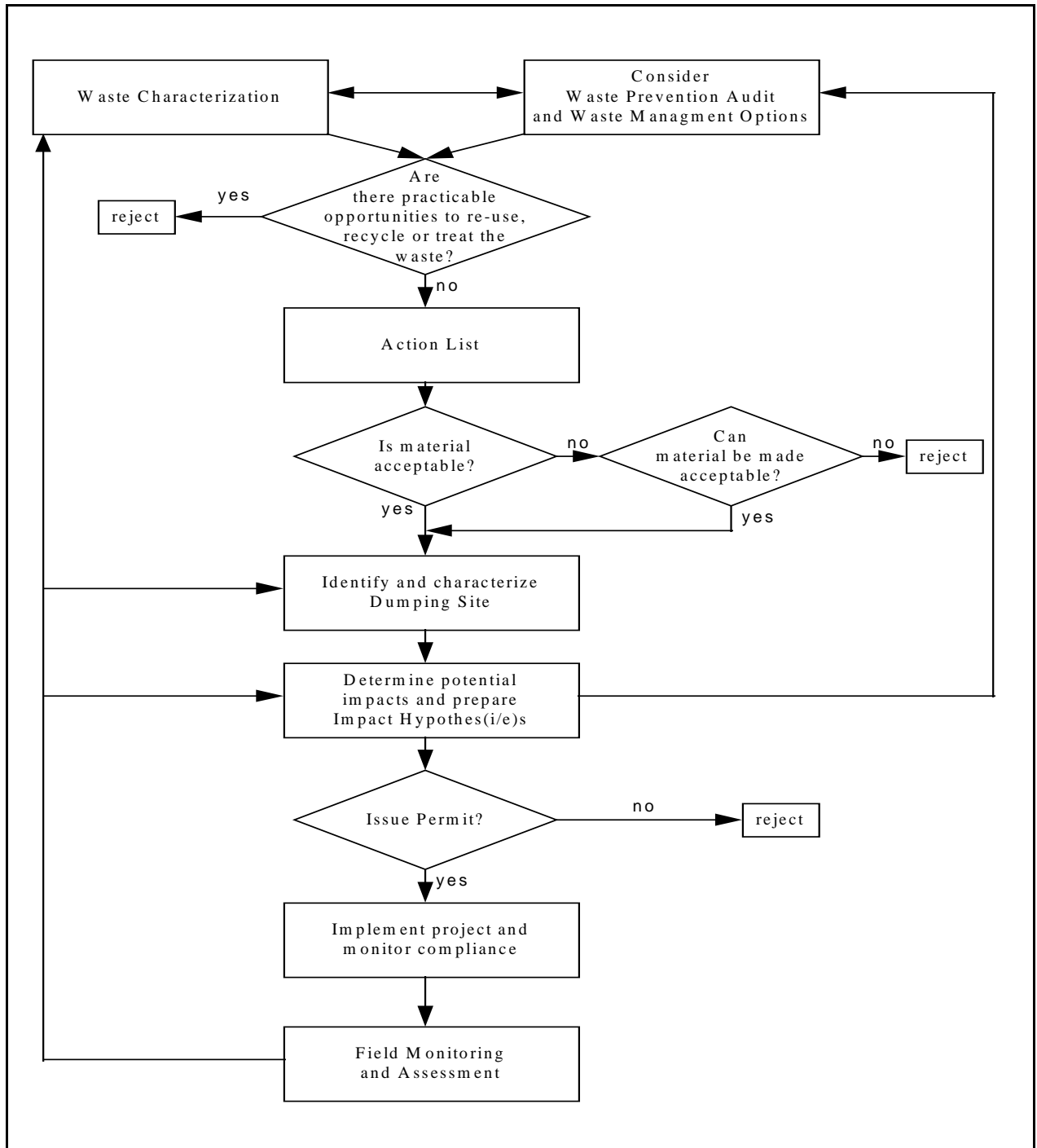
1.3 The schematic shown in Figure 1 provides a clear indication of the stages in the application of the Guidelines where important decisions should be made and is not designed as a conventional "decision tree". In general, national authorities should use the schematic in an iterative manner ensuring 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 1996 Protocol and contains the following elements:

- .1 Waste Characterization (Chapter 4) (Chemical, Physical and Biological Properties);

¹ The Nineteenth Consultative Meeting of Contracting Parties to the London Convention 1972 adopted these Guidelines in 1997.

- .2 Waste Prevention Audit and Waste Management Options (Chapters 2 and 3);
- .3 Action List (Chapter 5);
- .4 Identify and Characterize Dump-site (Chapter 6) (Dump-site Selection);
- .5 Determine Potential Impacts and Prepare Impact Hypothesis(es) (Chapter 7) (Assessment of Potential Effects);
- .6 Issue Permit (Chapter 9) (Permit and Permit Conditions);
- .7 Implement Project and Monitor Compliance (Chapter 8) (Monitoring); and
- .8 Field Monitoring and Assessment (Chapter 8) (Monitoring).

Figure 1



1.4 These Guidelines are specific to inert, inorganic geological material². Adherence to the following represents neither a more restrictive nor a less restrictive regime than that of the generic Guidelines of 1997.

2 WASTE PREVENTION AUDIT

2.1 The initial stages in assessing alternatives to dumping should, as appropriate, include an evaluation of:

- .1 types, amounts and relative hazards of wastes generated. As the material is inert, the relative hazards are confined to physical impacts;
- .2 details of the production process and the sources of wastes within that process; and
- .3 feasibility of the following waste reduction/prevention techniques:
 - .1 clean production technologies;
 - .2 process modification;
 - .3 input substitution; and
 - .4 on-site, closed-loop recycling.

2.2 In general terms, if the 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.

2.3 For this category of material the most pertinent issue will be waste minimization.

3 CONSIDERATION OF WASTE MANAGEMENT OPTIONS

3.1 Applications to dump wastes or other matter shall demonstrate that appropriate consideration has been given to the following hierarchy of waste management options, which implies an order of increasing environmental impact:

- .1 re-use, such as refilling of mines;
- .2 recycling such as road construction and building materials; and
- .3 disposal on land, and into water.

3.2 A permit to dump wastes or other matter shall be refused if the permitting authority determines that appropriate opportunities exist to re-use, recycle or treat the waste without undue risks to human health or the environment or disproportionate costs. 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.

² The Twenty-second Consultative Meeting of Contracting Parties to the London Convention 1972 adopted these specific Guidelines in 2000.

4 CHEMICAL, PHYSICAL AND BIOLOGICAL PROPERTIES

4.1 The character and form of the material and the basis on which it is characterized as geological and inert in the marine environment should be specified. From this specification, it should be demonstrated that the chemical nature of the material (including uptake of any elements or substances from the material by biota) is such that the only effects will be due to its physical properties. Thus, the assessment of the environmental impacts will be based solely upon origin, mineralogy, and the total amount and physical nature of the material.

4.2 Characterization of the material and its constituents shall take into account:

- .1 origin, including mineralogy, total amount, and the form in which it is intended to be dumped; and
- .2 physical persistence.

5 ACTION LIST

5.1 The Action List provides a screening mechanism for determining whether a material is considered acceptable for dumping. It constitutes a crucial part of Annex 2 to the 1996 Protocol and the Scientific Group will continuously review all aspects of it to assist Contracting Parties with its application. It may also be used in meeting the requirements of Annexes I and II to the London Convention 1972. However, as inert materials will not interact with biological systems other than through physical processes, Action List considerations do not require detailed consideration.

6 DUMP-SITE SELECTION

Site selection considerations

6.1 Proper selection of a dump-site at sea for the reception of waste is of paramount importance.

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

- .1 physical and biological characteristics of the water-column and the seabed;
- .2 location of amenities, values and other uses of the sea in the area under consideration;
- .3 assessment of the constituent fluxes associated with dumping in relation to existing sediment fluxes; and
- .4 economic and operational feasibility.

6.3 Guidance for procedures to be followed in 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). Prior to selecting a dump-site, it is essential that data be 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. Only those biological features relevant to physical effects such as turbidity and sediment transport require detailed consideration.

6.4 Some of the important amenities, biological features and uses of the sea to be considered in determining the specific location of the dump-site are:

- .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;
- .10 engineering uses of the seafloor, including mining, undersea cables, desalination or energy conversion sites.

Size of the dump-site

6.5 Size of the dump-site is an important consideration for the following reasons:

- .1 it should be large enough, unless it is an approved dispersion site, 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 to accommodate anticipated volumes of solid waste and/or liquid wastes to be diluted to near background levels before or upon reaching site boundaries;
- .3 it should be large enough in relation to anticipated volumes for dumping so that it would serve its function for many years; and
- .4 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, especially for solid wastes, the following should be taken into consideration:

- .1 the anticipated loading rates per day, week, month or year;
- .2 whether or not it is a dispersive site; and
- .3 the allowable reduction in water depth over the site because of mounding of material.

Evaluation of potential impacts

6.7 Due consideration needs to 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 augment existing fluxes associated with natural processes, dumping at the site under consideration should be deemed inadvisable. The only fluxes that are relevant to inert, inorganic geological material are sediment transport fluxes in the water column and at the sediment-water interface. Particular attention needs to be paid to

the degree to which deposition of material may result in effects on marine benthos (e.g., smothering, changes in benthos diversity, habitat modification).

6.8 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.

The primary consideration relevant to these provisions is the physical effects of inert, inorganic geological materials on biota in the water column and benthos and habitat modification.

Contaminant mobility

6.9 Contaminant mobility is dependent upon several factors, among which are:

- .1 type of matrix;
- .2 form of contaminant;
- .3 physical state of the system, e.g., temperature, water flow, suspended matter; and
- .4 biological activities, e.g., bioturbation.

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.

7.2 The assessment for dumping should integrate information on waste characteristics, conditions at the proposed dump-site(s), fluxes and proposed disposal techniques and specify 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.

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.

7.5 Even the least complex and most innocuous wastes may have a variety of physical, chemical and biological effects. Impact hypotheses cannot attempt to reflect them all. It must be recognized that even the most comprehensive impact hypotheses may not address all possible scenarios such as unanticipated impacts. It is therefore imperative that the monitoring programme 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. The only effects requiring detailed consideration in this context are physical impacts on biota.

7.6 The expected 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 would be no doubt as to the variables to 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. The following factors should be addressed:

- .1 physical changes and physical effects on biota; and
- .2 effects on sediment transport.

7.8 In the case of repeated or multiple dumping operations, 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 or 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 MONITORING

8.1 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 such monitoring programmes have clearly defined objectives.

8.2 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 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?

8.3 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 licensing authority will require additional information before any final decision on the permit application is made.

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 whether the zone of impact and the extent of change outside the zone of impact differ from those predicted. The former can be answered by designing a sequence of measurements in space and time that ensures that the projected spatial scale of change is not exceeded. The latter can be answered by the acquisition of measurements that provide information on the extent of change that occurs outside the zone of impact as a result of the dumping operation. Frequently, these measurements will be based on a null hypothesis - that no significant change can be detected.

8.6 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.

9 PERMIT AND PERMIT CONDITIONS

9.1 A decision to issue a permit should only be made if all impact evaluations are completed and the 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. Any permit issued shall contain data and information specifying:

- .1 the types, amounts and sources of materials to be dumped;
- .2 the location of the dump-site(s);
- .3 the method of dumping; and
- .4 monitoring and reporting requirements.

9.2 If dumping is the selected option, then a permit authorizing dumping must be issued in advance. It is recommended that opportunities are 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.

9.3 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.

9.4 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.
