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## INTRODUCTION

### Preface

These guidelines are intended to assist the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) in the implementation of the Protocol for the Prevention and Elimination of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft or Incineration at Sea (the Dumping Protocol), hereinafter referred to as "the Protocol", with regard to the dumping of platforms or other man-made structures into the Mediterranean Sea.

The Protocol was adopted on 16 February 1976 by the Conference of Plenipotentiaries of the Coastal States of the Mediterranean Region for the Protection of the Mediterranean Sea. The Protocol was amended and signed by 16 Contracting Parties on 10 June 1995. It is expected to enter into force in 2001.

These guidelines are intended for use by national authorities in evaluating applications for the dumping of platforms and/or other man-made structures so as to prevent pollution in the Mediterranean Sea in a manner consistent with the provisions of the 1972 London Convention (Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, 1972) and/or the 1996 Protocol thereto.

It is, however, implicitly recognised that the general considerations and detailed procedures described in these guidelines are not applicable in their entirety to all national or local situations.

### Definitions

For the purposes of these guidelines:

1. "Platforms: means facilities designed and operated for the production, processing, storage, or in support of the production of mineral resources.
2. "Other man-made structures at sea" means lighthouses, buoys and other offshore-transfer facilities.<sup>1</sup>

The disposal of vessels at sea is not covered by these guidelines.

### Background

Offshore platforms may consist of any fixed or floating offshore installation or structure engaged in mineral resource exploration, exploitation or production activities. In general, oil and gas platforms constitute the majority of platforms, which may be considered for disposal at sea.

Platforms are composed of two principle elements – the *substructure* and the *topsides*. The purpose of the substructure is essentially to keep the deck and processing

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<sup>1</sup> The London Convention or the 1996 Protocol does not present a specific definition of "other man-made structures at sea".

facilities above water. It typically consists of a concrete or steel-type supporting structure. Except for some floating structures and gravity-based structures, the substructure does not generally contain any oil, chemicals or other such substances. The topsides are the part of the platform on which processing equipment is located, along with water treatment units, drilling equipment and accommodation for workers. There are a number of potential sources of pollution associated with the production processes and related operations carried out on platforms. These may include hydrocarbons and other contaminants in the pipework and holding/processing tanks, drilling mud, stocks of processing chemicals, lubricants, coolants and fuel, as well as other potentially contaminating substances used in the operation of support equipment.

It is recognised that the disposal of platforms at sea may have an adverse impact on human safety, health and the ecological and aesthetic value of the marine environment. For this reason, the Contracting Parties are urged to take all practicable measures to encourage platform operators to give priority to other options before deciding on the disposal at sea of platforms as the preferred alternative. The adoption of best environmental practice (BEP) is essential.

These Guidelines consist of two parts. Part 'A' deals with the assessment and management of disposal at sea, while Part 'B' provides guidance on the monitoring of marine disposal sites.

The Guidelines begin with a summary of the provisions of the Dumping Protocol, which relate to the control of all disposal operations at sea. This is followed by Sections 2, 3, 4 and 5 which deal with the assessment of the characteristics and composition of materials to be disposed at sea, including best environmental practice, dump site selection and the potential impacts of disposal at sea. Section 6 provides guidance on the conditions under which permits may be issued for the disposal at sea of platforms and other man-made structures.

## **PART A**

### **ASSESSMENT AND MANAGEMENT OF DUMPING OPERATIONS AT SEA**

#### **1. REQUIREMENTS OF THE DUMPING PROTOCOL**

In accordance with Article 4.1 of the Protocol, the dumping of wastes or other matter from ships and aircraft is prohibited.

Nevertheless, under the terms of Article 4.2(d) of the Protocol, an exception may be made to this principle for the dumping of platforms and other man-made structures, which may be authorised under certain conditions (the removal to the maximum extent of material capable of creating floating debris or otherwise contributing to pollution of the marine environment).

Under the terms of Article 5, the dumping of wastes or other matter listed in Article 4.2 requires a prior special permit from the competent national authorities.

Furthermore, in accordance with Article 6.1 of the Protocol, the permit referred to in Article 5 shall be issued only after careful consideration of the factors set forth in the Annex to the Protocol and taking into consideration article 20 of the offshore protocol.

Article 6.2 provides that the Contracting Parties shall draw up and adopt criteria, guidelines and procedures for the dumping of wastes or other matter listed in Article 4.2 so as to prevent, abate and eliminate pollution.

Article 7 of the Protocol states that incineration at sea is prohibited.

#### **2. ASSESSMENT OF THE CHARACTERISTICS AND COMPOSITION OF MATERIALS TO BE DISPOSED AT SEA**

The identification, description and characterisation of potential sources of pollution is an essential prerequisite for any decision on whether a permit may be issued for the disposal at sea of a platform or other man-made structure. If a waste material is so poorly characterised that a proper assessment cannot be made of its potential impact on the environment, then that waste should not be dumped at sea and a permit should not be issued. Potential sources of pollution associated with platform production processes and related operations/modules are listed in Annex A.

The characteristics of a waste or a mixture of waste materials from multiple sources should be evaluated in terms of their physical, chemical and biological properties. Different wastes require different considerations depending on the environmental transport, lifetime and fate of their components in the sea.

However, the characterisation of all types of wastes through chemical and biological analysis may not be necessary where the required pollution prevention plans are developed and implemented on the basis of best environmental practice (BEP). For example, waste analyses may be limited to appropriate measurements of the composition of major components, without it being necessary to determine the potential effects of specific materials where field observations are available on the impact of similar materials at similar sites in the vicinity.

## 2.1 Physical characterisation

The following physical properties of waste matter should be evaluated prior to dumping/disposal:

- the physical state of the waste as a solid, solid in suspension, sludge or liquid;
- the amount of the waste;
- the dimensions of the solid waste;
- the miscibility of the waste in water;
- the density or specific gravity of bulk materials and their ability to float or sink to the sea bottom;
- the rate of the physical deterioration of the waste in water;
- physical changes to the waste after release, including the possible formation of new compounds; and
- the characteristics of the waste in relation to:
  - its potential for refloating and agglomeration as a result of surface water convergence;
  - its potential interference with fishing gear, shipping activities and amenities;
  - its potential impact in altering seabed sediments, grain sizes and consistency, resulting in adverse ecological effects on marine life; and
  - the possibility of it washing up on beaches.

## 2.2 Chemical characterisation

It is necessary to determine the chemical properties of a waste in order to assess its potential effects on water quality and on biota. Knowledge of the raw materials and production processes helps in identifying the probable composition of the waste.

The following chemical properties of waste matters should be evaluated prior to dumping/disposal:

- the chemical state of waste substances (inorganic-ionic, organic-complexed, etc.);
- the chemical composition of the waste;
- the concentration of the waste;
- the acidity/alkalinity of the waste (pH);
- the chemical oxygen demand (COD) of the waste;
- the valence state of heavy metals in the waste;
- the flocculative and dispersive behaviour of the waste in water;
- the degree of adsorption of the waste in seabed sediments;
- the solubilisation and/or mobilisation of the waste in the seawater environment; and
- the rate of decomposition and formation of new alien compounds or other constituents in water.

## 2.3 Biological characterisation

Wastes can have a biological impact in two ways. They may add biological material, and especially micro-organisms, or they may modify the physical and chemical environment, thereby affecting existing flora and fauna.

The following biological properties of waste matter should be evaluated prior to dumping/disposal:

- chronic and acute toxicity of the waste for marine organisms;
- the biological oxygen demand (BOD) of the waste;
- the bioavailability of the substances contained in the waste;
- the bioaccumulation and rate of uptake of the substances contained in the waste;
- the persistence of the substances contained in the waste;
- the biodegradability of the substances contained in the waste;
- the biotransformation of the substances contained in the waste;
- the probability of the production of taints or other changes to marine biota; and
- the probability of the development of fish discoloration and bacterial and viral fish diseases.

### **3. DISPOSAL AT SEA: BEST ENVIRONMENTAL PRACTICE**

In accordance with the relevant provisions of the Protocol, the Contracting Parties should apply the criteria of best environmental practice (BEP), which means the selection of the appropriate option or combination of measures which ensure the most benefit or the least damage to the environment as a whole, at an acceptable cost, in both the long and short term. There are three aspects to BEP: cost, safety and technical difficulty.

In selecting the BEP for the disposal of platforms or other man-made structures at sea, the following range of management options should be considered as a minimum:

- planning, including engineering/safety, economic and environmental analyses;
- the removal of all or part of the platform from the site;
- the re-use, recycling or disposal of parts which are removed from the site;
- the cleaning, where necessary, of parts which are not removed; and
- site clearance/shutdown operations, where appropriate.

#### **3.1 Waste management options**

The disposal options examined should include information on the characteristics of the platform or other man-made structure and the conditions at the proposed dumping site. The economic and technical feasibility of the options under consideration should be specified and their potential effects on human health, living resources, amenities, other legitimate uses of the sea and the environment in general should be evaluated. The key aspects of the various management options identified for the decommissioning of oil-drilling platforms are presented in tabular form in Annex B.

The timing of decommissioning and disposal operations should be determined by the financial and strategic considerations of the individual operators of each installation. In the case of oil platforms, for example, important factors in these decisions include the price of oil, operating and maintenance costs, the remaining life of the field and the potential to extend the life of the facility through the development of marginal fields, tie-back and satellite wells.

Within the limits of technical and economic feasibility, and taking into consideration to the greatest extent possible the safety of workers, platforms and other man-made structures should be cleaned of petroleum hydrocarbons and of other substances which are likely to harm the marine environment. Any other materials which may create floating debris should also be removed. Specific action for the identification of potential sources of pollution should be set out in detail in the disposal management plan, taking into account the following:

- the production, processing and transportation modules of the platform or structure in relation to their potential sources and amounts of wastes, and their potential hazards; and
- the feasibility of cleaning pipes and tanks, and of re-using, recycling or disposing on land all or some of the modules of the platform, with particular reference to topsides and plant and machinery for production, processing and the production of power, as well as storage, transportation and accommodation modules.

Naturally occurring radioactive materials produced during extractive processes and materials from the cleaning of equipment and topsides may be disposed of as follows:

- cleaned from equipment and deposited at a deep sea dump site, since such materials are not considered to be radioactive under the London Convention; and
- in the case of radioactive materials and all contaminated equipment, disposed onshore in a specialised controlled landfill site.

Details of various pollution prevention and clean-up techniques which may be used to clean platforms and other man-made structures prior to disposal are contained in Annex C.

### 3.2 Assessment of management disposal plans

The assessment of disposal options for platforms or other man-made structures should be based on the underlying premise that any adverse impacts on the environment are to be minimised through the implementation of the pollution prevention plan and best environmental practice. The purpose of the pollution prevention plan is specifically to ensure that wastes and other substances which contribute to the pollution of the marine environment are removed to the maximum extent possible.

Contaminants should be removed from platforms and other man-made structures prior to their disposal at sea and limitations on contaminating substances should be met through the implementation of the pollution prevention plan and best environmental practice. This is necessary to ensure that platforms and structures have been cleaned to the maximum extent possible. Pollution prevention and clean-up techniques for platforms and other man-made structures are described in Annex C.

Although it is not strictly covered by these Guidelines, the vicinity of the platform or other man-made structure should be cleared of debris that may interfere with other legitimate uses of the sea, in accordance with the requirements of the pertinent International Maritime Organisation (IMO) guidelines, within reasonable and technically feasible limits.

## **4. SELECTION OF THE DUMPING SITE**

Matters relating to the criteria for the selection of the dumping site are addressed in greater detail in studies prepared by GESAMP (Reports and Studies No. 16: *Scientific criteria for the selection of waste disposal sites at sea*, IMO 1982).<sup>2</sup>

### 4.1 Assessment of the disposal site

The criteria for selecting a new site for dumping operations should be determined so as to minimise interference with the environment and with other current and potential users of the sea. Basic information on the site under consideration should include the coordinates (latitude and longitude) of the disposal site, as well as its location with regard to:

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<sup>2</sup> GESAMP: IMCO/FAO/UNESCO/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Pollution.



- the nearest coastline
- recreational areas
- sport and commercial fishing areas
- areas of natural beauty or significant cultural or historical importance
- shipping lanes
- military exclusion zones
- engineering uses of the seabed (e.g. potential or ongoing seabed mining, undersea cables, desalination or energy conversion sites).

Consideration also has to be given to the size and capacity of the dumping site for future use as a dumping ground for other platforms and/or structures in the area. In such cases, the following aspects should be taken into consideration:

- the dumping site should be large enough to contain the bulk of the anticipated waste material within the site limits or within a predicted impact area after dumping;
- the capacity of the dumping site should be sufficient to accommodate the anticipated volumes of solid and/or liquid waste to be diluted to near background levels before or upon reaching the boundaries of the site;
- the size and capacity of the dumping site should be sufficiently large to contain the anticipated volumes of waste for a pre-determined period of time; and
- the dumping site should be sufficiently large to allow the necessary monitoring to be carried out without undue expenditure of time and money.

The presence of other dumping sites in the vicinity of a proposed new site has to be taken also into account, since they could affect decisions relating to the amounts and types of wastes to be dumped at the site and the frequency of dumping operations. This condition also applies for existing dumping sites under consideration for new disposal operations.

Finally, site selection criteria should include the physical, sedimentological and biological characteristics of the seabed and surrounding area in which the site is to be located, details of which are given below:

#### 4.2 Physical considerations

For platforms and other man-made structures, particular attention should be paid to constituents of the waste which float on the surface or which, in reaction with seawater, may produce floating substances and which, because they are confined to a two-dimensional rather than a three-dimensional medium, may disperse very slowly. The possibility of the reaccumulation of such substances as a result of the presence of surface convergences, which may interfere with amenities, as well as fisheries and shipping, has to be investigated. In general, the most important physical factors influencing the transport and mixing of waste consist of:

- *the oceanic flow environment*: several types of motion contribute significantly to turbulence and shear levels, resulting in the mixing of waste; these include surface waves, tidal and inertial oscillations, wind driven surface currents and the internal circulation of the ocean;
- *turbulent diffusion*: this process influences the spreading of waste through turbulent eddies;
- *shear induced diffusion*: this process results in the advection of waste due to variations in velocities with depth; and

- *vertical mixing*: this waste mixing process is caused by the intermittent hydrodynamic instability of water.

Analyses of these physical phenomena may be required to predict the behaviour of waste once it has been disposed at sea.

Consideration also needs to be given to the potential of material left on the seabed to snag fishing gear, taking into account its location, condition and the existence of any fishery exclusion zones. The structures of greatest concern in this respect are pipelines, because their large spans and exposed broken ends of pipes could snag fishing gear and pose a threat to vessels and fishermen.

#### 4.3 Sedimentological considerations

Marine sediments and suspended particulate have a high potential sorption capacity in respect of many types of inorganic and organic waste substances. In some cases, much of the contaminant can be virtually immobilised by the sediment through a very strong adsorption process.

In high-energy regions, sediment dispersion will occur and resuspended sediments with their associated pollutants may be transported substantial distances horizontally and vertically.

Waste which is sorbed by undisturbed sediments is usually in the upper surface layer of such sediments. Penetration of contaminants into the deeper layers may occur through bioturbative processes, which carry surface sediments contaminated with pollutants down to several tens of centimetres.

In areas where larger amounts of organic materials reach the sea bottom, the oxygen consumed by reactions may exceed the rate of oxygen supply.

Sediment stability is another factor which needs to be taken into account in any assessment of waste disposal sites. Mass submarine movements can involve enormous volumes of sediment. These occur in the form of slumps, slides, debris flows and turbidity currents, which are activated by a number of factors, including tectonic events, sediment overloading, erosion and changes in sediment compaction.

#### 4.4 Biological considerations

An evaluation of the biological sensitivity of potential dumping areas needs to be made, either through a study of existing data or, if necessary, by means of new surveys. The main considerations are summarised below:

- *fishing grounds and aquaculture sites*: dumping in active fishing areas can affect the living resources, interfere with fishing vessels and may damage or foul fishing gear;
- *breeding and nursery grounds*: certain grounds, although not in use for fishing, may be important for fish stocks through their role as spawning, nursery or feeding areas;
- *migration routes*: migrating species use their acute senses of detection to find their native region or to move from one area to another; dumped materials may disrupt the physiological detection processes used by the fish, resulting in migrating species becoming confused as to their migration routes;

- *areas of high productivity or other special interest* some areas may be judged to require particular attention because of unusually high biological productivity; the dumping of toxic substances in such areas could reduce production, while the addition of wastes containing nutrients, whether organic or inorganic, may augment primary production and result in eutrophication.

Depending on the characteristics of waste materials, certain general precautions should be observed in planning disposal operations. If the waste contains toxic materials, the dilution achieved during disposal and the subsequent mixing with seawater will determine whether the concentrations are likely to damage the marine biota.

#### 4.5 Assessment of the site in the event of disposal *in situ*

The basic characteristics of the site of the offshore platform or structure have to be reassessed in the event of its use as a disposal site. The information that is required should include the items mentioned above.

Consideration should also be given to any effects, which may be caused by an increase in certain constituents of the waste or by their interaction (e.g. synergistic effects) with other substances introduced previously into the area.

The risk needs to be examined of the material shifting from its position at the disposal site at some future time. The risk of the breakdown of the structure also needs to be assessed.

At the site in question, the existing stress on biological communities as a result of other activities should be assessed before any new or additional disposal operations are undertaken. The possible future uses of the sea area need to be kept under consideration.

Any relevant information from baseline and monitoring studies at already established disposal sites should be taken into account.

## **5. EVALUATION OF THE POTENTIAL IMPACTS OF THE DISPOSAL AT SEA OF OFFSHORE PLATFORMS OR STRUCTURES**

Any adverse environmental impacts of the disposal at sea of offshore platforms or structures should be minimised through the implementation of the pollution prevention plan and best environmental practices. Such adverse effects should in any case be limited to the following:

- the site of the platform/structure;
- other platform/structure sites;
- deep sea dump sites;
- the coastal and estuarine area of the Mediterranean Sea;
- onshore facilities for receiving and dismantling structures;
- recycling facilities; and,
- waste disposal facilities and sites.

Significant physical impacts at the disposal site of offshore platforms or structures disposed of at sea may include:

- physical and chemical perturbation of seabed sediments;
- physical and chemical perturbation of the water column;

- short and long-term effects on pelagic and benthic invertebrates;
- short and long-term effects on fish and fisheries; and
- short and long-term effects on users of the sea.

With a view to assessing the likely magnitude of impacts from decommissioning activities, background data should be obtained on:

- the dispersal and dilution of chemicals offshore;
- the impact of metals from anodes;
- the potential bioaccumulation or biomagnification of metals in marine organisms;
- the effects of metals and hydrocarbons in the sea;
- the effects of naturally occurring radioactive materials in the sea compared with their disposal on land;
- the corrosion of steel and the creation of debris; and
- the potential movement of debris in the sea.

When assessing the impact of disposal operations, it may be necessary to compare the physical and, where appropriate, the chemical or biological quality of the affected area with reference to sites located away from the disposal site. Experience of the selection of reference sites for biological and physical monitoring can be acquired from monitoring programmes carried out in the vicinity of offshore platforms. Such areas can be identified during the early stages of impact assessment.

To avoid excessive use of and impacts on the seabed, the number of dumping sites should be limited in so far as possible. To the maximum extent possible, each site should be used without interfering with navigation.

Interference with the migration or spawning of fish or crustaceans, or with seasonal fishery activities, may be avoided by the imposition of timing restrictions on disposal operations.

## **6. REQUIREMENTS FOR THE AUTHORIZATION OF THE DUMPING AT SEA OF PLATFORMS AND OTHER MAN-MADE STRUCTURES**

The Protocol establishes the permitting requirements for the sea disposal operations of a *single* offshore platform or other man-made structure.

### **6.1 Requirements for a permit application**

Any application for a permit has to contain data and information specifying:

- the types, amounts and sources of the materials to be dumped;
- the location of the dumping site(s);
- History of previous dumping operations and/or past activities with negative environmental impacts;
- the method of dumping; and
- the proposed monitoring and reporting arrangements.

### **6.2 Criteria for the evaluation of a permit application**

Article 6.1 of the Protocol states that a permit shall be issued only after careful consideration of the factors set forth in the Annexes to the Protocol, article 20 of the offshore protocol or the criteria, guidelines and procedures adopted by the Contracting Parties. The

criteria for the evaluation of a permit application, which should be applied on a case-by-case basis, include:

- reference data linked to particular methods of disposal or disposal sites, such as data on seabed conditions, quantities and position of discharged cuttings and concentrations of oil in sediments;
- the residual quantities of removed substances (cleaning efficiency) after completion of the cleaning of the platform or structure to be disposed at sea; and,
- a comparison of the incremental impact of the disposal of a component in or around the stump of a platform or structure as compared with the impact of its disposal at an alternative site.

Before considering the dumping of platforms and other man-made structures, or parts thereof, at sea, every effort should be made to determine the practical availability of alternative land-based methods of treatment, disposal or elimination, as well as treatment to render the platforms or structures less harmful for dumping at sea, taking into consideration article 20 of the offshore protocol.

In special cases where it is decided to dump platforms and other man-made structures at sea, this should be regarded as an exception. The practical availability of other means of disposal should be considered in the light of a comparative assessment of:

- their potential impact on the environment, including:
  - their effects on marine habitats and communities, and other legitimate uses of the sea;
  - the effect of their on-shore re-use, recycling, or disposal, including potential impacts on land, surface and groundwater and air pollution; and
  - the impact of the use of the necessary energy and materials (including an overall assessment of the use of energy and materials and the savings achieved through re-use, recycling or disposal options), including transportation and the resultant environmental impact.
- their potential impact on human health, including:
  - the identification of routes of exposure and the analysis of potential impacts on sea and land re-use, as well as of recycling and disposal options, including the potential secondary impacts of energy use; and
  - the quantification and evaluation of the safety risks associated with onshore re-use, recycling and disposal, compared with disposal at sea.
- their technical and practical feasibility, including:
  - the evaluation of engineering capacities for specific types, sizes and weights of platforms; and
  - the identification of the practical limitations of disposal alternatives, taking into account the characteristics of the platform and oceanographic considerations.
- economic considerations, including:
  - an analysis of the full cost of platform re-use, recycling or disposal alternatives, including their secondary impacts; and
  - a review of costs in relation to benefits in such areas as resource conservation and the economic benefits of steel recycling.

Where the comparative assessment reveals that adequate information is not available to determine the likely effects of the proposed disposal option, including the potential long-term harmful consequences, then this option should not be considered further. In addition, where analysis of the comparative assessment shows that the dumping option is less preferable than a land alternative, a permit should not be issued for the dumping.

Each assessment should conclude with a statement in support of a decision to either issue or refuse a permit for dumping.

Opportunities should be provided for public review and participation in the permit evaluation process.

### 6.3 Conditions for issuing a permit

A decision to issue a permit should be based on the elements provided by a pre-disposal site survey. If the characterisation of these conditions is insufficient for the formulation of an *impact hypothesis*, additional information will be required before any final decision is made with regard to issuing a permit.

A decision to issue a permit should only be made where all the impact assessments are complete, taking into account the defined criteria, and where the monitoring requirements have been determined. The conditions set out in the permit should be such as to ensure, in so far as practicable, that environmental disturbance and detriment are minimised, and that benefits are maximised.

In the event that the determined criteria cannot be met, a Contracting Party should not issue a permit unless a detailed assessment shows that disposal at sea is nonetheless the least detrimental option. Where such a conclusion is reached and a permit is issued, the Contracting Party should take all practical steps to mitigate the impact of the disposal operation on the marine environment.

Regulators should strive at all times to enforce procedures which ensure that environmental changes are as far below the limits of allowable environmental change as practicable, taking into account technological capacities and economic, social and political considerations.

The authority responsible for issuing the permit should take into consideration relevant research findings when specifying permit requirements.

### 6.4 Supplemental conditions for issuing a permit for an existing dumping site

The issuing of a permit for platforms disposal at a site where past dumping activities were carried out should be based on a comprehensive review of results and objectives of existing monitoring programmes. The review process provides an important feedback and informed decision-making regarding the impacts of further disposal activities, and whether a permit may be issued for further dumping operations on site. Furthermore, such a review will indicate whether the field-monitoring programme needs to be continued, revised or terminated.

## PART B

### MONITORING OPERATIONS FOR THE DISPOSAL AT SEA OF OFFSHORE PLATFORMS AND OTHER MAN-MADE STRUCTURES

#### 1. DEFINITION

For the purposes of assessing and regulating the environmental impacts of disposal operations, monitoring is defined as the repeated measurement of an effect, whether direct or indirect, on the marine environment and/or of interferences with other legitimate uses of the sea.

#### 2. OBJECTIVES

In order to carry out the monitoring programme in a resource-effective manner, it is essential for the objectives of the programme to be clearly defined. The monitoring observations required at a disposal site tend to fall into two basic categories:

- predisposal investigations designed to assist in the selection of the site or to confirm that the selected site is suitable; and
- post-disposal studies intended to verify that:
  - the permit conditions have been met; this process is referred to as *compliance monitoring*; and,
  - the assumptions made during the permit issuing and site selection processes were valid and adequate to prevent adverse environmental effects as a consequence of disposal; this process is referred to as *field monitoring*, with the results of such reviews providing the basis for modifying the criteria for issuing a new permit for future dumping operations at existing and proposed disposal sites.

The ultimate purpose of monitoring is to assess the effects of the disposal activity on the biotic and abiotic environment.

#### 3. IMPACT HYPOTHESIS

The objectives of the monitoring programme are dictated by the potential impacts of the disposal operation. The predicted consequences of these effects can be described as an *impact hypothesis*. This hypothesis is derived from the characteristics of the platform/structure to be dumped and the nature of the dumping site. The hypothesis should encompass spatial as well as temporal effects. The impact hypothesis forms the basis of the field-monitoring programme.

In order to formulate an impact hypothesis, it may be necessary to conduct a baseline survey or surveys to describe the characteristics of the proposed receiving area and the variability of these characteristics over time. Ideally, initial observations should extend over at least one year so that seasonal variations can be detected. Observations will need to be carried out both in and around the disposal site and it must be accepted that it may prove necessary at any stage to change the position of the site in the light of observations made.

Survey observation results should identify primary areas of potential impact, namely those considered to be the most sensitive. Areas of impact should include alterations to the physical environment, the devaluation of marine resources and interference with other legitimate uses of the sea.

The predicted consequences of disposal activities are described in terms of effects on recipients (e.g. the nature of spatial and/or temporal change on the habitat, response or degree of interference with biological community use). The prediction of any relevant target/effect combination should be described in sufficient detail to guide field and analytical work in the subsequent monitoring programme so that relevant information can be obtained in the most efficient and cost-effective manner.

## **4. MONITORING**

### **4.1 Quality control**

Quality control is defined as the operational techniques and activities that are used to fulfill requirements relating to quality. These include monitoring criteria and standards, sampling methods, sample locations and frequency, and reporting procedures.

Before any monitoring programme is developed and implemented, the following quality control issues have to be addressed:

- What testable hypotheses can be derived from the impact hypothesis?
- What exactly should be measured?
- What is the purpose of monitoring a particular variable or physical, chemical or biological effect?
- In what compartment and at which locations can measurements be made most effectively?
- For how long should the measurements be carried out to meet the defined aim?
- With what frequency should measurements be carried out?
- What should be the temporal and spatial scale of the measurements made to test the impact hypothesis?
- How should the data from the monitoring programme be managed and interpreted?

Monitoring observations are typically concerned with the physical, chemical and biological characteristics of the dumping site.

- Physical observations consist of hydrological surveys of water mass properties, such as temperature, salinity and density, over the entire water column and extending horizontally over the entire region likely to be affected by the waste.
- Chemical observations conducted in and around the disposal site need to be related to the type of waste involved. Generally, where it is not possible to remove all potentially contaminating material from an offshore platform or structure before disposal (e.g. in emergencies), and where chemical effects may therefore be expected, proper analyses need to be carried out of the surface microlayer of sea sediments, which constitute an extremely active biological zone in which a wide range of chemicals, such as heavy metals and oil soluble substances, tend to accumulate. Chemical observations also need to be conducted on sea sediments where substances, although not present in the waste in major quantities or



concentrations may, because of their persistent nature, accumulate either on the seabed or in benthic communities in the vicinity of the disposal site.

- The frequency of biological observations should reflect the scale of the disposal operation and the degree of risk to potential resources. Where physical effects on the seabed are expected, it may be necessary to conduct an assessment of the phytoplankton and zooplankton biomass and productivity prior to disposal to establish a general picture of the area. Observations of the plankton immediately following disposal can help to determine whether acute effects are occurring. Monitoring of the benthic and epibenthic flora and fauna is likely to be more informative because they tend to be subjected not only to the influence of the overlying water column and any changes that occur in it, but also to changes in the sediments resulting from the solids present in the waste.

Post-disposal monitoring should be designed to determine:

- whether the impact zone differs from the zone predicted; and
- whether the extent of changes outside the impact zone differs from those predicted.

The former can be ascertained by designing a sequence of measurements in space and time with a view to ensuring that the projected spatial scale of change is not exceeded. The latter can be shown through measurements which provide information on the extent of the change occurring outside the impact zone as a result of the dumping operation. These measurements are often based on a null hypothesis, i.e. that no significant change can be detected.

The spatial extent of sampling depends on the size of the area designated for disposal. However, it must be recognised that long-term variations arise as a result of purely natural causes and that it may be difficult to distinguish them from changes which are induced artificially, particularly in relation to populations of organisms.

Where it is considered that effects are likely to be largely physical, monitoring may be based on remote methods (e.g. acoustic measurements, side-scan sonar). It must be recognised, however, that certain ground measurements will always remain necessary for the interpretation of the remote sensing images.

Concise reports on monitoring activities should be prepared and made available to relevant stakeholders and other interested parties. Reports should detail the measurements made, the results obtained and the manner in which these data relate to the monitoring objectives and confirm the impact hypothesis. The frequency of reporting will depend on the scale of the dumping operation, the intensity of monitoring and the results obtained.

#### 4.2 Quality assurance

Quality assurance may be defined as all planned and systematic activities implemented to provide adequate confirmation that monitoring activities are fulfilling requirements related to quality.

The results of monitoring activities should be reviewed at regular intervals in relation to their objectives in order to provide a basis for:

- modifying or terminating the field monitoring programme;
- amending or revoking the dumping permit;

- redefining or closing the dumping site; and
- modifying the basis for assessing dumping permits in the Mediterranean Sea.

The results of any reviews of monitoring activities should be communicated to all Contracting Parties involved in such activities.

The licensing authority is encouraged to take relevant research findings into consideration with a view to the modification of monitoring programmes.

## ANNEX A

### Types and potential sources of pollutants in oil-drilling platforms

The principal components of an oil-drilling platform are not in themselves of overriding concern from the standpoint of marine pollution. However, there are a number of potential sources of pollution associated with platform production processes and related operations. The chemicals and other process items on oil-drilling platforms which are likely to have an effect on the marine environment are listed below. The evaluation of potential sources of pollution from other man-made structures should be based on a similar approach.

#### *Types of chemicals with a negative impact on the environment*

• The quantities of hydrocarbons, low specific activity scale and other contaminants in pipework and tankage;
• Stocks of chemicals used in connection with oil and gas production, e.g. corrosion inhibitors, biocides, defoamers and de-emulsifiers;
• Lubricants and coolants in platform equipment; and
• Fuel

#### *List of items/modules in platforms which may contain substances of concern for the environment*

• Electrical equipment, such as transformers, batteries and accumulators	• Pumps
• Coolers	• Engines
• Scrubbers	• Generators
• Separators	• Oil sumps
• Heat exchangers	• Hydraulic systems
• Drilling mud holding/reprocessing tanks	• Tubing and drill strings
• Storage facilities for production and other chemicals	• Gas dehydrators
• Diesel tanks, including bulk storage tanks	• Gas sweetening units
• Sacrificial anodes	• Helicopter fuelling systems
• Fire-fighting equipment	• Insulation systems
• Piping, valves and fittings	



## ANNEX B

### Options for the decommissioning of oil-drilling platforms

The following includes a list of options identified for the decommissioning of topsides, steel jackets, pipelines, concrete gravity bases and cuttings, which constitute the main components of a typical offshore oil-drilling platform. This table is adapted, in part, from *The Auris Report*.<sup>3</sup>

<p><b><u>Topsides</u></b></p> <ol style="list-style-type: none"> <li>1. Pieces small dismantle, onshore disposal</li> <li>2. Modular dismantle, onshore disposal</li> <li>3. Modular dismantle, strip onshore and dispose, stripped module to controlled site</li> <li>4. Modular dismantle, strip onshore and dispose, stripped module to reef</li> <li>5. Modular dismantle, strip onshore and dispose, stripped module to deep sea</li> <li>6. Modular dismantle, strip offshore, deposit stripped module <i>in situ</i>, waste to land</li> <li>7. Modular dismantle, strip offshore, waste to land, topple stripped modules <i>in situ</i></li> <li>8. Modular dismantle, strip offshore, deposit stripped module in controlled site, waste to land</li> <li>9. Modular dismantle, strip offshore, deposit stripped module at reef, waste to land</li> <li>10. Modular dismantle, strip offshore, deposit stripped module in deep sea, waste to land</li> </ol> <p><b><u>Pipeline</u></b></p> <ol style="list-style-type: none"> <li>1. Treat internally, leave <i>in situ</i></li> <li>2. Plough and backfill <i>in situ</i></li> <li>3. Rock dump in-situ</li> <li>4. Remove spans and dispose onshore, leave remainder <i>in situ</i></li> <li>5. Remove spans and deposit at reef, leave remainder <i>in situ</i></li> <li>6. Remove spans and deep sea dump, leave remainder <i>in situ</i></li> <li>7. Totally remove and dispose onshore</li> <li>8. Totally remove and deposit at reef</li> <li>9. Totally remove and deep sea dump</li> </ol>	<p><b><u>Steel Jacket</u></b></p> <ol style="list-style-type: none"> <li>1. Topple <i>in situ</i> in absence of cuttings</li> <li>2. Partially remove and lay beside stump</li> <li>3. Partially remove and deposit in controlled site</li> <li>4. Partially remove and deposit at reef</li> <li>5. Partially remove and deep sea dump</li> <li>6. Partially remove, dismantle and dispose onshore</li> <li>7. Totally remove in absence of cuttings and deposit in controlled site</li> <li>8. Totally remove in absence of cuttings and deposit at reef</li> <li>9. Totally remove in absence of cuttings and deep sea dump</li> <li>10. Totally remove in absence of cuttings, dismantle and dispose onshore</li> <li>11. Totally remove in presence of cuttings and deposit in controlled site</li> <li>12. Totally remove in presence of cuttings, dismantle and dispose onshore</li> </ol> <p><b><u>Concrete Gravity Base</u></b></p> <ol style="list-style-type: none"> <li>1. Leave <i>in situ</i></li> <li>2. Refloat in absence of cuttings and deep sea dump</li> <li>3. Refloat in absence of cuttings, dismantle inshore, dispose waste onshore</li> </ol> <p><b><u>Pile of drill cuttings</u></b></p> <ol style="list-style-type: none"> <li>1. Bury in pit <i>in situ</i></li> <li>2. Bury by rock dumping <i>in situ</i></li> <li>3. Cap with membrane <i>in situ</i></li> <li>4. Retrieve, treat and dispose onshore</li> <li>5. Retrieve, treat onshore, deep sea dump treated material</li> <li>6. Retrieve, re-inject down wells</li> </ol>
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<sup>3</sup> *The Auris report: An assessment of the environmental impacts of decommissioning options for oil and gas installations in the UK North Sea*, June 1995.

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## **ANNEX C**

### **Pollution prevention and clean-up techniques for platforms and other man-made structures**

#### **Pollution prevention**

In matters relating to the protection of the Mediterranean Sea, it is essential for the Contracting Parties to cooperate with a view to promoting the effective and harmonized implementation of the Protocol for the Prevention and Elimination of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft or Incineration at Sea.

For this purpose, the Contracting Parties should assist each other in investigating violations of anti-pollution measures which have occurred or are suspected to have occurred within the Mediterranean Sea area. This assistance should include public reports on findings and the lessons learned.

The Contracting Parties should encourage operators of platforms to consider the implementation of the following graduated range of preventive measures:

- the development and application of codes of good environmental practice covering all aspects of activities related to the disposal of platforms/structures;
- mandatory labelling to inform users of environmental risks related to materials intended for disposal;
- the provision of suitable collection and storage media for various types of waste;
- the recycling, recovery and re-use of waste; and
- avoidance of the use of hazardous substances and products and the generation of hazardous wastes.

The Contracting Parties should consider the application to specific activities, products or groups of products of economic incentives and/or penalties to encourage the adoption of appropriate preventive measures and good environmental practices.

Furthermore, the Contracting Parties should consider the incorporation in licensing systems of appropriate preventive restrictions or prohibitions.

#### **Clean-up techniques**

To prevent the release of substances which could cause harm to the marine environment, the cleaning of tanks, pipes and other platform equipment and surfaces must be carried out in an environmentally sound manner prior to disposal using appropriate techniques, such as high pressure washing techniques with detergents. The resulting cleaning water should either be taken ashore for treatment or be treated offshore, in accordance with national or regional standards, to prevent the release of potential pollutants.

In principle, the following clean-up measures should be implemented prior to the disposal of platforms and other man-made structures at sea:

- the removal of floatable materials which could have an adverse impact on safety, human health or the ecological or aesthetic value of the marine environment;
- the removal of hydrocarbons, stocks of industrial or commercial chemicals, drilling mud or wastes that may create an adverse risk for the marine environment; and

- the flushing, cleaning and, as appropriate, sealing or plugging of any part of the platform jacket used for the storage of hydrocarbons or chemical stocks, such as tanks integrated in the legs of the jacket.



DRAFT

GUIDELINES FOR THE DUMPING OF PLATFORMS AND OTHER MAN-MADE  
STRUCTURES AT SEA

*List of amendments made to document sent on 30 January 2001*

INTRODUCTION

- an additional part **Definitions** was added between parts **Preface** and **Background**
- in **Background**:
  - 2<sup>nd</sup> and 3<sup>rd</sup> paragraphs were removed
  - last paragraph was modified

original: "The Guidelines begin with a summary of the provisions of the Dumping Protocol which relate to the control of all disposal operations at sea, followed by guidance on the conditions under which permits may be issued for the disposal at sea of platforms and other man-made structures. Sections 3, 4, 5, and 6 consist of considerations relating to the assessment of the characteristics and composition of materials to be disposed at sea, including best environmental practice, dumping site selection and the potential impacts of disposal at sea."

revised: "The Guidelines begin with a summary of the provisions of the Dumping Protocol, which relate to the control of all disposal operations at sea. *This is followed by Sections 2, 3, 4 and 5 which deal with the assessment of the characteristics and composition of materials to be disposed at sea, including best environmental practice, dump site selection and the potential impacts of disposal at sea. Section 6 provides guidance on the conditions under which permits may be issued for the disposal at sea of platforms and other man-made structures.*"

PART A

- **Point 1.** Paragraph 4 was modified:

original: "Furthermore, in accordance with Article 6.1 of the Protocol, the permit referred to in Article 5 shall be issued only after careful consideration of the factors set forth in the Annex to the Protocol."

revised: "Furthermore, in accordance with Article 6.1 of the Protocol, the permit referred to in Article 5 shall be issued only after careful consideration of the factors set forth in the Annex to the Protocol *and taking into consideration article 20 of the offshore protocol.*"

- **Point 2.** was shifted to point **6**. Points **3.** to **6.** in original document become **2.** to **5.** in revised document

*Modifications hereunder refer to numbers in revised document:*

- Point 4.1

- title was changed from "Assessment of a new disposal site" to "Assessment of the disposal site"
- paragraph after first enumeration has been changed and shifted after the second enumeration:

original: "The presence of other dumping sites in the vicinity of a proposed new site has to be taken into account, since they could affect decisions relating to the amounts and types of wastes to be dumped at the site and the frequency of dumping operations."

revised: "The presence of other dumping sites in the vicinity of a proposed new site has to be taken *also* into account, since they could affect decisions relating to the amounts and types of wastes to be dumped at the site and the frequency of dumping operations. *This condition also applies for existing dumping sites under consideration for new disposal operations.*"

- the word "finally" has been added at the beginning of the last paragraph

- **Point 6.** (point 2. in original document)

- 1<sup>st</sup> paragraph modified:

original: "The Protocol establishes the requirement of a specific permit for the disposal at sea of an offshore platform or other man-made structures."

revised: "The Protocol establishes *the permitting requirements for the sea disposal operations of a single offshore platform or other man-made structure.*"

- point 6.1 third bullet in enumeration was added
- point 6.2

1<sup>st</sup> paragraph was modified:

original: "Article 6.1 of the Protocol states that a permit shall be issued only after careful consideration of the factors set forth in the Annex to the Protocol, or the criteria, guidelines and procedures adopted by the Contracting Parties. The criteria for the evaluation of a permit application, which should be applied on a case-by-case basis, include:"

revised: "Article 6.1 of the Protocol states that a permit shall be issued only after careful consideration of the factors set forth in the *Annexes* to the Protocol, *article 20 of the offshore protocol* or the criteria, guidelines and procedures adopted by the Contracting Parties. The criteria for the evaluation of a permit application, which should be applied on a case-by-case basis, include:"

2<sup>nd</sup> paragraph was modified:

original: "Before considering the dumping of platforms and other man-made structures, or parts thereof, at sea, every effort should be made to determine the practical availability of alternative land-based methods of treatment,

disposal or elimination, as well as treatment to render the platforms or structures less harmful for dumping at sea.”

revised: “Before considering the dumping of platforms and other man-made structures, or parts thereof, at sea, every effort should be made to determine the practical availability of alternative land-based methods of treatment, disposal or elimination, as well as treatment to render the platforms or structures less harmful for dumping at sea, *taking into consideration article 20 of the offshore protocol.*”

- point 6.3 last paragraph was added
- point 6.4 new title and paragraph:

original: “2.4 Conditions for the review of a permit

Permits should be reviewed at regular intervals, taking into account the results and objectives of monitoring programmes. The review of monitoring results will indicate whether field programmes need to be continued, revised or terminated, and will contribute to informed decision-making regarding the continuation, modification or revocation of permits. The review process provides an important feedback mechanism for the protection of human health and the marine environment.

The authority responsible for issuing the permit should take into consideration relevant research findings when reviewing permit requirements.”

revised: “6.4 *Supplemental conditions for issuing a permit for an existing dumping site*

*The issuing of a permit for platforms disposal at a site where past dumping activities were carried out should be based on a comprehensive review of results and objectives of existing monitoring programmes. The review process provides an important feedback and informed decision-making regarding the impacts of further disposal activities, and whether a permit may be issued for further dumping operations on site. Furthermore, such a review will indicate whether the field-monitoring programme needs to be continued, revised or terminated.*”

## **PART B**

- **Point 2**

1st paragraph modified:

original “-the assumptions made during the permit review and site selection process were valid and adequate to prevent adverse environmental effects as a consequence of disposal; this process is referred to as field *monitoring*, with the results of such reviews providing the basis for modifying the criteria for the assessment of future license applications.”

revised “-the assumptions made during the permit issuing and site selection processes were valid and adequate to prevent adverse environmental effects as a consequence of disposal; this process is referred to as field *monitoring*, with the results of such reviews providing the basis for modifying the criteria for *issuing a new permit for future dumping operations at existing and proposed disposal sites.*”