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Intergovernmental Review Meeting of
Mediterranean Coastal States and
First Meeting of the Contracting Parties
to the Convention for the Protection of
the Mediterranean Sea against Pollution
and its related protocols

Cannes, 5 - 10 February 1979

Proposals for procedures to be followed and definitions
required for implementation of the Protocol for the
Prevention of Pollution of the Mediterranean Sea
by Dumping from Ships and Aircraft

Introduction

Article 13(vi) of the Convention for the Protection of the Mediterranean Sea against Pollution calls upon UNEP, as the Organization responsible for carrying out the secretariat functions of the Convention and its related protocols:

"To ensure the necessary co-ordination with other international bodies which the Contracting Parties consider competent, and in particular, to enter into such administrative arrangements as may be required for the effective discharge of the secretariat functions".

In accordance with this responsibility, UNEP has consistently participated as an observer in the meetings of the various Commissions or interim Commissions dealing with:

- (i) Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London, 1972);
- (ii) Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo, 1972);
- (iii) Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 1974);
and
- (iv) Convention on the Prevention of Marine Pollution from Land-Based Sources (Paris, 1974).

Within the area of prevention of pollution from dumping activities, the work that has been carried out under the London and Oslo Conventions, and, in particular, by the scientific groups established for each Convention, may provide some useful precedents for the Parties to the Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft (hereinafter referred to as the Protocol). What follows is a review of the relevant work that has been accomplished to date.

Notification Procedure

Article 7 of the Protocol reads as follows:

"The permits referred to in Articles 5 and 6 above shall be issued only after careful consideration of all the factors set forth in Annex III to this Protocol. The Organization shall receive records of such permits."

When considering a similar provision in the London Dumping Convention, Article V(2), the Parties to the London Convention adopted procedures to be applied which include:

- (i) basic criteria for determining exceptional or emergency situations; and
- (ii) procedures for consultative advice and safe disposal of matter in such circumstances, including the designation of appropriate dumping areas.

These procedures are attached as Annex III to this document.

It should be noted that the procedures were adopted on an interim basis on the understanding that they would be reviewed in the light of experience gained in their practical implementation. However, no notification of emergency dumping has been submitted to the Organization (IMCO), and, therefore, no information was available on additional criteria concerning the characteristics of dumping sites and the method of disposal in case of emergency. Consequently, the third meeting of the London Dumping Convention Parties agreed that further development of the interim criteria should be deferred.

While recognizing the special regional needs and environmental concerns related to the Mediterranean Sea which must be addressed by Parties to the Protocol, the Secretariat would propose that Annex III be used as a basis of discussion for developing appropriate procedures to be followed if a "critical situation of an exceptional nature" should arise within the territory of a Party as foreseen in Article 9 of the Protocol.

Definition of "Harmlessness" and "Trace Contaminants"
for purposes of Annex I

Substances which may not be dumped in the Mediterranean Sea Area are listed in Annex I of the Protocol. Paragraphs A.1 and A.2 of Annex I prohibit the dumping of organohalogen compounds and organosilicon compounds, "excluding those which are rapidly converted in the sea into substances which are biologically harmless".

Section B of Annex I sets forth another qualification to the application of Annex I as follows:

"This Annex does not apply to wastes or other materials, such as sewage sludge and dredge spoils, containing the substances referred to in paragraphs 1-6 above as trace contaminants. The dumping of such wastes shall be subject to the provisions of Annexes II and III as appropriate".

The London and Oslo Conventions contain similar provisions in the Annexes listing substances which it is prohibited to dump.

The Contracting Parties to these Conventions agreed that it was necessary to define more clearly the terms "harmless" and "trace contaminants" for the effective application of the legal instruments.

The Oslo Commission requested its scientific working group to consider substances listed in paragraphs 1 and 2 of its Annex I (organohalogen compounds and organosilicon compounds, respectively) for the purpose of recommending the most suitable method of determining whether or not such substances are either biologically harmless or are rapidly converted to harmless substances in the sea.

On the recommendation of the working group, the Oslo Commission adopted, as an interim measure until such time as suitable procedures may be agreed by the Commission for determination of Annex I substances which are non-toxic or rapidly converted in the sea into biologically harmless substances, a prior consultation procedure. The outline of this procedure is attached as Annex IV to this report.

In parallel with the prior consultation procedure, the Commission also adopted interim definitions for terms used in the Convention. These are attached as Annex V to this report.

After additional work by the scientific group, six basic tests were endorsed which should be carried out to provide data on wastes proposed for dumping under the prior consultation procedure. In endorsing the six tests, the Oslo Commission noted that in no way should they be seen as preventing a State from carrying out additional tests to provide further supporting data. It was also noted that the tests were experimental, and the Commission requested the Contracting Parties to try out the tests and comment on their use. In parallel with endorsing the six tests, the Oslo Commission adopted a standard form for reporting the test results for use in the prior consultation procedure. This form is attached herewith as Annex VI.

For the purposes of the London Dumping Convention, the Contracting Parties have adopted a very similar approach. Based on the work of the Ad Hoc Scientific Group, the Third Consultative Meeting of the Parties adopted interim guidelines for the implementation of paragraphs 8 and 9 of Annex I (paragraphs containing qualifications "rapidly rendered harmless" and "trace contaminants" respectively) of the London Dumping Convention. These guidelines include two appendices: the first setting forth text procedures for the interpretation of "trace contaminants" and "harmlessness", and the second outlining the basic information to be provided for the purposes of consultation procedures called for in the guidelines. The guidelines and appendices are contained in Annex VII to this report.

The scientific group of the London Convention agreed that it would not be appropriate to recommend detailed standard test procedures within the framework of the London Convention (as was done for the Oslo Convention Parties), but that general guidance should be given to the Contracting Parties as to which types of tests should be carried out, and how. Consequently, this general guidance is outlined in one of the appendices to the guidelines set forth in Annex VII to this report.

As a first step, it is necessary for the Parties to decide upon the form to be used when notifying the Organization of permits issued in accordance with Articles 5 and 6 of the Protocol.

The Oslo Commission has agreed to the standardization of its form with that of the form adopted for purposes of the London Dumping Convention. A copy of the form is attached as Annex I to this report.

The London Dumping Convention procedure specifies two types of notification:

- (i) immediate notification of each Special Permit issued; and
- (ii) annual notification by 31 March each year of the record of General Permits issued in the previous calendar year.

Article VI of the London Dumping Convention provides that Contracting Parties may report to the Organization (IMCO) "directly or through a Secretariat established under a regional agreement".

The Oslo Commission has decided that any immediate notification of each Special Permit issued should be sent directly to the London Convention Secretariat with a copy to the Oslo Commission. The Secretariat of the Oslo Commission has agreed to prepare a consolidated report of general permits issued on the basis of quarterly returns submitted to it by the Contracting Parties of its region for submission to the London Convention Secretariat.

Since not all of the Parties to the Protocol are Contracting Parties to the London Convention, the Secretariat would propose that:

- (i) the same format for notification of permits issued be adopted by the Mediterranean States party to the Protocol;
- (ii) the requirement of immediate notification for special permits issued and a deadline of January of each year for an annual report of general permits issued in the previous calendar year also be adopted;
- (iii) each Party assume the responsibility of submitting by 31 March a copy of its national annual report or immediate notification for special permits to the Secretariat of the London Convention if it is a Contracting Party to that Convention.

In this way States party to both legal instruments will be able to fulfil their obligations through one, harmonized procedure.

It is also useful to note that both the London and Oslo Commissions have requested Parties to submit "nil" reports if no permits have been issued so as to avoid confusion as to whether a party has not issued any permits or is negligent in meeting its obligations under the Convention.

Annual Reports on all dumpings carried out

The experience of the Secretariats to the London and Oslo Conventions has shown that reporting on specific and general permits issued for dumping is not sufficient to give an accurate assessment of present dumping practices, i.e. quantities of substances being dumped, when, and where.

Consequently, the Oslo Commission agreed that each Party would be obligated to submit an annual report on all dumpings carried out so as to facilitate an assessment of the inputs through dumping by the Contracting Parties to the waters covered by the Convention. A copy of the form such an Annual Report should follow is attached as Annex II to this document.

The Parties to the London Dumping Convention agreed that such reports should be submitted, on a voluntary basis, according to the format adopted by the Oslo Commission. With regard to dumping of radioactive wastes, it was agreed that the Parties would follow the form prepared by the OECD/NEA. The London Convention States also requested their Ad Hoc Scientific Group to review the forms adopted by the Oslo Commission with a view to making recommendations concerning an appropriate final form to be used for the purpose of the global Convention.

The Secretariat would propose that the Parties to the Protocol agree to submit information on actual dumping activities and that for the purposes of supplying the Secretariat with this information the form attached as Annex II be adopted.

Procedures to be followed in a "critical situation of an exceptional nature".

Article 9 of the Protocol reads as follows:

"If a Party in a critical situation of an exceptional nature considers that wastes or other matter listed in Annex I to this Protocol cannot be disposed of on land without unacceptable danger or damage, above all for the safety of human life, the Party concerned shall forthwith consult the Organization. The Organization, after consulting the Parties to this Protocol, shall recommend methods of storage or the most satisfactory means of destruction or disposal under the prevailing circumstances. The Party shall inform the Organization of the steps adopted in pursuance of these recommendations. The Parties pledge themselves to assist one another in such situations."

The second appendix to the London Convention guidelines is almost identical to the format for basic information to be provided under the Prior Consultation Procedure adopted by the Oslo Commission. The only difference is that whereas the London Convention guidelines simply require the results of the tests performed to be reported, the Oslo Commission Procedure is much more specific as to the precise tests to be carried out.

The Secretariat would propose that the Parties to the Protocol agree to guidelines and procedures for the purpose of determining "harmlessness" and "trace contaminants" of Annex I substances similar to those adopted by Parties to the London Convention. The necessity for adopting detailed tests procedures may be reviewed at a later stage in light of the experience gained in implementing the protocol.

Acid and alkaline compounds

Paragraph A.8 of Annex I of the Protocol refers to:

"Acid and alkaline compounds of such composition and in such quantity that they may seriously impair the quality of sea water. The composition and quantity to be taken into consideration shall be determined by the Parties in accordance with the procedure laid down in article 14, paragraph 3, of this Protocol, which refers to review and amendment to the Annexes by the Contracting Parties .

Paragraph 2 of Annex II, which should be considered in parallel with the paragraph above, refers to:

(i) Acid and alkaline compounds the composition and quantity of which have not yet been determined in accordance with the procedure referred to in Annex I, paragraph A.8;

(ii) Acid and alkaline compounds not covered by Annex I, excluding compounds to be dumped in quantities below thresholds which shall be determined by the Parties in accordance with the procedure laid down in Article 14, paragraph 3 of this Protocol.

It is clear that it will be necessary for the Parties to the Protocol to establish a working group to define "of such composition and in such quantity" for the purposes of paragraph A.8 of Annex II. The Parties may wish to establish an ad hoc working group during the first meeting of the Contracting Parties to try to resolve this issue immediately, or the Parties may instruct the Secretariat to convene a working group during the interim period between meetings of the Parties. The working group could then report its findings to the second Meeting of the Contracting Parties in 1981. If the latter means is selected, it will be necessary to make the requisite recommendation in the workplan and allocation of financial resources in the programme and budget to be adopted for the 1979/1980 biennium.

In order to assist the working group in its study, the Secretariat has attached herewith decisions taken by other organizations with regard to waste from the titanium dioxide industry. Annex VIII sets forth the Code of Practice for the Dumping of Acid Wastes from the Titanium Dioxide Industry at Sea that was adopted by the Cslo Commission in December 1977. Annex IX includes a Directive adopted by the Council of the European Communities on 20 February 1978 on waste from the titanium dioxide industry.

Radioactive waste

Paragraph A.7 of Annex I reads:

"High- and medium- and low-level radioactive wastes or other high- and medium- and low-level radioactive matter to be defined by the International Atomic Energy Agency."

Paragraph 5 of Annex II reads:

"Radioactive waste or other radioactive matter which will not be included in Annex I. In the issue of permits for the dumping of this matter, the Parties should take full account of the recommendations of the competent international body in this field, at present the International Atomic Energy Agency."

For the purposes of the London Dumping Convention, the IAEA has prepared, and revised, a definition and recommendations concerning radioactive waste unsuitable for dumping at sea. The definition and recommendations have been circulated as document UNEP/IG.14/INF.

The IAEA has suggested that this definition and recommendations might also be suitable for the purpose of paragraph A.7 of Annex I and paragraph 5 of Annex II of the Protocol. The Parties are invited to review the IAEA document and to decide upon any future action they may wish to see undertaken in this respect.

ANNEX 1

FORM OF REPORT FOR PERMITS AND APPROVAL ISSUED

1. Special permits issued in accordance with Article 6 of the Oslo Convention or Article VI(1)(b) of the London Convention should be notified immediately to the Organisation for the London Convention, with a copy to the Oslo Commission Secretariat. Approvals issued in accordance with Article 7 of the Oslo Convention should be notified quarterly to the Oslo Commission Secretariat.

2. The notifications should contain the following information, for each special permit or approval (unless in any individual case a particular item of information is clearly inappropriate):

- (a) Issuing authority;
- (b) Date issued;
- (c) Country of origin of wastes or other matter and port of loading;
- (d) General description of waste or other matter and the process from which the waste is derived;
- (e) Form in which waste or other matter is presented for disposal (i.e. solid, liquid or sludge);
- (f) Total quantity (in metric units) of waste or other matter covered by the permit;
- (g) Period for which permit is valid;
- (h) Expected frequency of dumping;
- (i) Chemical composition of waste or other matter (this should be sufficiently detailed to provide adequate information to other countries on the nature and composition);
- (j) Properties of waste or other matter:
 - (i) solubility;
 - (ii) density;
 - (iii) pH.
- (k) Method of packaging;
- (l) Method of release;

- (m) Procedure and site for subsequent tank washing;
- (n) Approved dumping site:
 - (i) geographical position (latitude and longitude);
 - (ii) depth of water;
 - (iii) distance from nearest coast.
- (o) Additional information (relevant factors listed in Annex III of the Convention, e.g. toxicity, other biological properties).

ANNEX II

ANNUAL REPORT ON ALL DUMPINGS CARRIED OUT DURING THE YEAR 19..

The purpose of this form is to facilitate an assessment of member countries' inputs to Convention waters by dumping.

The form must be completed for each calendar year in retrospect and submitted to the Secretary by 30 June following the year to which the dumping relates.

Member States are reminded that the figures for the quantities of substances dumped should relate to the actual amounts dumped during the report year and not to the quantities licensed.

For each dumping area the following information must be given:

COUNTRY:

1. DUMPING AREA

- (a) LOCATION - Longitude:
Latitude:
- (b) DEPTH metres
- (c) TIDAL FLOWS - Direction:
Maximum speed:
- (d) TYPE OF WASTE DUMPED (delete as appropriate)
Industrial wastes
Sewage sludges
Dredgings

(e) OTHER RELEVANT INFORMATION (e.g. residual water movements):

2. INDUSTRIAL WASTES DUMPED

Details need only be given for the categories listed in section 1(d) as having been dumped during the reporting year.

Units of quantity should be in tonnes unless otherwise stated.

- (a) YEAR OF ISSUE OF THE PERMITS CONCERNED
- (b) GENERAL DESCRIPTION OF THESE WASTES
- (c) METHOD OF DUMPING (when more than one vessel is involved, give the range of loads and discharge conditions)

- (i) Vessel(s) load
- (ii) Manner of discharge from vessel
- (iv) Rate of discharge
- (v) Speed of vessel while dumping
- (d) TOTAL QUANTITY OF WASTES ACTUALLY DUMPED
- (e) TOTAL QUANTITY OF WASTES LICENSED
- (f) TOTAL QUANTITY OF INSOLUBLE SOLIDS
- (g) TOTAL QUANTITY OF PARTICULATE
ORGANIC COMPONENTS
- (h) TOTAL QUANTITY OF TRACE CONTAMINANTS OF ANNEX I SUBSTANCES:
 - Mercury
 - Cadmium
 - Organohalogen compounds(specify)
 - Others
- (i) TOTAL QUANTITY OF THE FOLLOWING METALS:
 - Arsenic Nickel
 - Chromium Zinc
 - Copper Others
 - Lead
- (j) ANY OTHER COMPOUNDS PRESENT IN APPRECIABLE QUANTITY:
- (k) TOTAL QUANTITY OF STRONG ACIDS
strength/pH
- (l) TOTAL QUANTITY OF STRONG ALKALIS
strength/pH
- (m) TOXICITY OF WASTE(S) - Give LC-50 values and names of species tested.
(Where more than one waste is involved give toxicity criteria e.g. 96-h-LC-50 values not below 1000 ppm to Crangon crangon or Agonus cataphractus)
- (n) MONITORING AUTHORITY
- (o) OTHER RELEVANT INFORMATION:

3. SEWAGE SLUDGES DUMPED IN EACH SITE

Details need only be given for the categories listed in section 1(d) as having been dumped during the reporting year.

Units of quantity should be in tonnes unless otherwise stated.

- (a) YEAR OF ISSUE OF THE PERMITS CONCERNED
- (b) PLACE OF ORIGIN OF THE SEWAGE SLUDGE
- (c) METHOD OF DUMPING (where more than one vessel is involved, give the range of loads and discharge conditions)
 - (i) Vessel(s) load
 - (ii) Manner of discharge from vessel
 - (iii) Rate of discharge
 - (iv) Speed of vessel while discharging
- (d) TOTAL QUANTITY ACTUALLY DUMPED
- (e) TOTAL QUANTITY LICENSED
- (f) TOTAL QUANTITY OF INSOLUBLE SOLIDS
- (g) TOTAL QUANTITY OF PARTICULATE ORGANIC COMPONENTS
- (h) TOTAL QUANTITY OF TRACE CONTAMINANTS OF ANNEX I SUBSTANCES:
 - Mercury
 - Cadmium
 - Organohalogen compounds (specify)
 - Others
- (i) TOTAL QUANTITY OF FOLLOWING METALS:
 - Arsenic Nickel
 - Chromium Zinc
 - Copper Others
 - Lead
- (j) MONITORING AUTHORITY:

4. DREDGINGS DUMPED IN EACH SITE

Details need only be given for the categories listed in section 1(d) as having been dumped during the reporting year.

Units of quantity should be in tonnes unless otherwise stated.

When less than 10,000 tones per year are dumped, chemical analysis of dredgings composition are not required unless the source of the dredging is believed to be polluted.

- (a) YEAR OF ISSUE OF THE PERMITS CONCERNED
- (b) PLACE OF ORIGIN OF THE DREDGINGS
- (c) METHOD OF DUMPING: Stationary/Moving (delete as appropriate)
- (d) TOTAL QUANTITY ACTUALLY DUMPED
- (e) TOTAL QUANTITY LICENSED
- (f) TOTAL QUANTITY OF INSOLUBLE SOLIDS
- (g) TOTAL QUANTITY OF PARTICULATE
 ORGANIC COMPONENTS
- (h) TOTAL QUANTITY OF TRACE CONTAMINANTS OF ANNEX I SUBSTANCES:
 - Mercury
 - Cadmium
 - Organohalogen compounds (specify)
 - Others
- (i) TOTAL QUANTITY OF THE FOLLOWING METALS:
 - Arsenic Nickel
 - Chromium Zinc
 - Copper Others
 - Lead
- (j) MONITORING AUTHORITY:

ANNEX III

INTERIM PROCEDURES AND CRITERIA FOR
DETERMINING EMERGENCY SITUATIONS

1. Under Article V(2), a Contracting Party may issue a special permit for the dumping of wastes or other matter listed in Annex I in emergencies posing an unacceptable risk relating to human health and admitting no other feasible solution. Before doing so the Party is obliged to consult any other country or countries that are likely to be affected and the Organization which, after consulting other Parties and international organizations as appropriate, shall, in accordance with Article XIV promptly recommend to the Party the most appropriate measures to adopt.

2. In this connexion Article XIV(4)(e) states that Contracting Parties may develop or adopt, in consultation with appropriate international organizations, procedures referred to in Article V(2) including:

- (a) basic criteria for determining exceptional or emergency situations; and
- (b) procedures for consultative advice and safe disposal of matter in such circumstances, including the designation of appropriate dumping areas.

ACTION REQUIRED TO IMPLEMENT ARTICLE V(2)

3. In the implementation of the above provisions the following sequence of actions can be envisaged:

(a) In order to decide that an emergency does in fact exist, the Party proposing to issue a permit for the dumping of Annex I materials would:

- (i) investigate the situation to decide whether or not it poses an unacceptable risk relating to human health;
- (ii) investigate possible alternative methods of disposal in order to decide that no feasible solution other than ocean dumping can be found.

(b) Having decided that ocean disposal is necessary, the Party concerned would:

- (i) consult with other countries that may be affected; and
- (ii) consult with the Organization for recommendations as to the most appropriate procedures to adopt.

(c) Upon being informed of the situation, the Organization would:

- (i) consult with other Parties;
 - (ii) consult with other appropriate international organizations; and
 - (iii) decide upon and promptly recommend to the Party the most appropriate procedures to adopt.
- (d) In issuing the special permit for the dumping operation the Party concerned would:
- (i) follow the Organization's recommendations to the maximum extent feasible consistent with the time within which action must be taken and with the general obligation to avoid damage to the marine environment; and
 - (ii) inform the Organization of the action taken.

ACTION BY THE PARTY CONCERNED

Assessment of the Emergency Situation

4. With reference to paragraph 3(a) above, it is apparent that when an emergency situation involving Annex I materials occurs, the first step to be taken by the Party is to assess the risk to human health. Such assessment should include the following factors:

- (a) Circumstances of the emergency:
 - (i) type including chemical composition of material involved;
 - (ii) location and cause of release;
 - (iii) amount lost into the environment;
 - (iv) potential for further release and expected rate.
- (b) Risk relating to human health:
 - (i) toxicity to human life:
 - by inhalation
 - by ingestion
 - by skin absorption;
 - (ii) method of contact;
 - direct contact with material
 - water supply
 - food sources;

(iii) impact on health of present and future generations:

- chronic toxicity
- carcinogenic, teratogenic and mutagenic properties of the material
- potential for causing long-term effects.

5. The feasibility of ocean disposal should only be considered by the Party after an evaluation of alternative methods of disposal, taking into account the following factors:

- (a) Alternatives to be considered including cost:
 - (i) land fill and soil disposal;
 - (ii) well injection;
 - (iii) incineration on land or at sea;
 - (iv) reclamation and recycling;
 - (v) biological, chemical or physical treatment;
 - (vi) storage;
 - (vii) partial treatment prior to ocean disposal.
- (b) Assessment of environmental impact of each alternative:
 - (i) adverse environmental effects of alternative actions;
 - (ii) impact on living and non-living marine resources, navigation, recreation and other uses of the ocean;
 - (iii) evaluation to determine which alternative has least overall environmental impact.
- (c) Disposal site designation and monitoring:
 - (i) physical, chemical and biological information relating to the proposed dump site;
 - (ii) proposed method of release of material at the site;
 - (iii) proposed times and dates of disposal;
 - (iv) monitoring to assess the impact of the material on the marine environment.

Consultation with other countries which may be affected

6. With reference to paragraph 3(b)(i) above, once it has been determined that an unacceptable risk to human health exists and that ocean disposal is the only feasible solution the Party should consult with other countries which may be affected. All the significant information used in making the determination, listed in paragraph 4 above, should be provided and include:

- (a) type including chemical composition of material;
- (b) amount of material to be dumped, location of disposal site and dates of disposal;
- (c) risk to human health;
- (d) adverse impact on the marine environment;
- (e) alternatives considered;
- (f) potential impact of action on other countries;
- (g) proposed actions to minimize potential adverse impacts;
- (h) proposed monitoring programme to determine impact.

Consultation with the Organization

7. With reference to 3(b)(ii) above, the information provided to the Organization initially by the Party proposing dumping will be dependent upon the urgency of the emergency situation. As a minimum the information provided to other countries (paragraph 6 above) should be submitted to the Organization and also include:

- (a) countries the Party has consulted with;
- (b) recommendations of the other countries;
- (c) extent to which the recommendations have been adopted.

In addition, the Party should submit to the Organization all significant information mentioned in paragraph 4 above.

ACTION TO BE TAKEN BY THE ORGANIZATION

Consultation within the Organization

8. In implementation of paragraph 3(c) above the Organization might undertake a sufficient review of the submissions by the Party to ensure that the Party has done the following:

- (a) demonstrated an unreasonable risk to human health;
- (b) evaluated other alternatives and found no other feasible solution;

(c) avoided damage to the marine environment to the maximum extent possible;

(d) established procedures to monitor the impact of the proposed action;

(e) consulted with other countries that may be affected and incorporated their recommendations into the proposed action.

9. If the Organization finds that further review and analysis is needed, the following action should be taken:

(a) refer specific questions to appropriate international organizations;

(b) consult with other Parties or countries which may be affected;

(c) consult with independent experts nominated by Contracting Parties.

Recommendations by the Organization

10. The Organization should, after consultation with other organizations, experts and Parties, recommend appropriate procedures which should be adopted by the Party prior to disposal. Due account should also be taken of any recommendations made by countries which may be affected by the proposed action.

REPORTING BY THE PARTY ON ACTION TAKEN

11. The Party should inform the Organization forthwith of the action taken and any additional facts relating to the disposal of the material. The Secretariat should inform all Parties of the emergency situation and actions taken as soon as practicable.

PROCEDURE FOR CONSULTATION

12. With a view to facilitating consultation between Parties and organizations, it would seem appropriate for each Contracting Party to designate a specific officer to act as a "focal point" for all communications of this nature. The Secretariat would collect the requisite information from Governments (name, designation, address, telephone and telex numbers, etc.) and prepare a comprehensive list for circulation to all concerned. The Secretariat would also communicate with other organizations such as UNEP, WHO, FAO, UNESCO/IOC and IAEA in order to arrange for the nomination of a suitable "focal point" in each case to expedite consultations relative to the Convention.

13. Upon being informed by the Party concerned of the circumstances of the emergency situation including the views of other States consulted by the Party, the Secretariat should proceed to arrange for consultations with a view to formulating appropriate recommendations. The procedure for consultation might be according to one of the following alternatives:

(a) convening a Special Meeting of Contracting Parties in accordance with Article XIV(3)(a) of the Convention to consider the problem; or

(b) establishing a smaller Panel of Contracting Parties which could be convened or consulted by the Secretariat at short notice.

14. The choice between alternatives (a) and (b) above would depend on the time available for consultation. If (a) is adopted, provision for (b) procedure might also be made for use in urgent cases, it being understood that the recommendations made by the Panel in such cases could be reviewed by all Parties at the next regular Consultative Meeting.

15. It also seems possible that consultation with other organizations might proceed simultaneously with the consultation with other Parties, either by the attendance of representatives of the organizations concerned at meetings of the Parties or by making direct enquiries on specific questions by telephone or telex as and when required. The Contracting Parties might also consider the possibility of inviting countries likely to be affected, to be represented at such meetings during consideration of the proposed dumping.

16. To facilitate the consideration of future cases involving emergency disposal of prohibited substances, the Secretariat will assemble and keep on file for ready reference, useful information and data relating to Annex I substances, particularly with regard to their hazards to human health, living marine resources and amenities, together with information on actual cases dealt with, including details of methods of disposal adopted, etc.

ANNEX IV

PRIOR CONSULTATION PROCEDURE

The following procedure was agreed by the Commission at its meeting in Oslo, 29-31 October 1974, to preclude misunderstandings between member States in those instances where the preliminary formulations of the terms "non-toxic", "rapidly converted" (both in Annex I) and "trace contaminants" (Article 8.2) are quoted to justify dumping.

1. If dumping of substances mentioned in Annex I is being considered on the assumption that they are "non-toxic" or "rapidly converted", or appear only as "trace contaminants", the Secretary of the Oslo Commission shall be advised as soon as possible and no later than four months prior to the time of the envisaged dumping. The same information as for the "reports on permits and approvals issued" should be given. Where appropriate, an indication may be provided of the considerations that led to a rejection of land-based processing or storage. The Secretary shall forward this information to the members of the Commission, who may respond within one month.
2. If one of the members of the Commission wishes to object against the proposed dumping, he must state within the period agreed upon why he considers dumping harmful, e.g. unpermissible. Alternative approaches to processing or storage of waste materials may be suggested. This response shall be sent to the Secretary as well as to the country that intends to resort to dumping. The Secretary may be requested to distribute the comments among the members of the Commission. When requested by a member of the Commission the proposed dumping shall be postponed whenever possible, until the matter has been considered at a subsequent ordinary or extraordinary meeting of the Commission. Unless mutual agreement is reached to defer the matter to a subsequent meeting of the Commission or to handle the issue bilaterally, the Commission member who envisages dumping shall advise the Commission through the Secretary on the course of action that will be followed. This reply should be supported by arguments, in particular regarding why there would be a need to proceed with the dumping before the issue could be brought up at a subsequent meeting of the Commission.
3. Where dumping has occurred without an agreement on the necessity of dumping or the way it has been carried out, the subject shall be brought up at the next meeting of the Commission. (As a matter of course, this leaves open the possibility stipulated by Rule 10.2 of the Rules of Procedure, to convene a special meeting of the Commission at the request of three delegations, possibly preceding the time set for dumping.)
4. The procedure outlined above does not, of course, affect Article 9 of the Convention, dealing with emergency procedures.

The procedure should not be construed as a substitute for further efforts to refine the definitions of the terms mentioned in paragraph 1. On the contrary, experience with this notification and consultation procedure may point the way towards an unambiguous interpretation of these terms.

ANNEX V

CONFIRMATION OF THE DEFINITION OF TERMS USED IN THE CONVENTION

- (a) Significant quantities
- (b) Non-toxic
- (c) Trace contaminants

(a) Significant quantities

The Working Group set up by the Preparatory Committee which met at the Hague in March 1972 agreed that for the purpose of Article 6 of the Convention a substance, included in Annex II, paragraph 1(a), is present in a significant quantity if this substance constitutes more than 0.1 per cent of the weight of the quantity of waste for disposal.

It was recognized that the Commission might wish to look further at the definition and to fix specific quantities for particular substances differing in toxicity.

(b) Non-toxic

The following definition was agreed at the Hague meeting:

"For the purposes of Annex I of this Convention "non-toxic" describes a substance which, after discharge to the marine environment, is not expected to be biologically harmful either immediately or in the longer term on the basis of existing scientific knowledge".

This definition was extended at the meeting of the Preparatory Committee held at Hamburg in October 1972 as follows:

"All synthetic organohalogen and organosilicon compounds which on the basis of established scientific knowledge have been shown to be bio-accumulated should, for the time being, be regarded as potentially harmful".

(c) Trace contaminants

The following definition was agreed at the meeting of the Preparatory Committee held in Hamburg in October 1972:

"For the purpose of Article 2(2) "trace contaminants" are substances which, when present in otherwise acceptable wastes, do not occur in such amounts that the dumping of wastes causes significant undesirable effects, including the possibility of danger associated with their bio-accumulation in marine organisms and especially in food species".

It was noted that few countries had details of quantities of Annex I substances present in sewage sludges and harbour dredgings, nor in naturally occurring deposits. Delegates were informed that some of this information was being gathered together by ICES, and after discussion it was recommended that the Commission should take action to draw together this information.

ANNEX VI

DEGRADABILITY OF SUBSTANCES IN PARAGRAPHS 1 AND 2 OF ANNEX I : BASIC INFORMATION TO BE PROVIDED UNDER THE PRIOR CONSULTATION PROCEDURE

The prior consultation procedure of the Oslo Commission relates to proposals to dump substances which are excluded from the prohibition in paragraphs 1 and 2 of Annex I of the Convention and to substances which may be toxic but are considered to be trace contaminants for which the environmental risk associated with dumping is acceptable. It is **recognized** that for many of these compounds viable alternative methods of treatment, destruction or disposal on land might be available and these alternative methods should be pursued, as required by the Convention.

The purpose of the following procedures is to give guidance on the appraisal of such wastes for which dumping has to be considered and the presentation of the evidence in support of the proposal to dump. The test procedures advocated can only produce scientific evidence on which to base a decision. They are to some extent still experimental and experience is necessary as regards their practical application and the interpretation of the results. They cannot give conclusive proof that a substance is biologically harmless, especially in the longer term. Scientifically such proof is impossible; the tests can only provide evidence for judging whether the environmental risk is acceptable or not.

The following paragraphs draw attention to the more important aspects of the appraisal and set out the headings under which information is Required:

1. Alternative disposal options

Itemize all of the alternative methods which have been considered and rejected, e.g. treatment, storage, destruction or disposal on land. Give the reasons for the rejection in each case.

2. Origin of waste

Give a description of the process from which the waste is derived to indicate the possible nature of the waste. It is not necessary to set out the process in detail.

3. Amount of waste

Give (a) the total amount of waste expected to arise annually;
(b) the frequency of dumping;
(c) the amount to be dumped on each occasion.

4. Form in which the waste is presented for dumping

State the form of the waste, quantify the maximum amount of solids present and give information on particle sizes.

5. Chemical composition

Give the chemical identification of compounds present in the liquid and solid phases and the quantification of these compounds. Specify the analytical methods used, including information on detection limits, precision and accuracy, as appropriate.

6. Physico/chemical characteristics

Give the physico/chemical characteristics of the waste, e.g. specific gravity, volatility, solubility, pH and of its specific compounds.

7. Results of tests carried out for determining degradation and biological harmfulness

For trace contaminants included in paragraphs 4 and 5 of Annex I, degradation tests may not be appropriate. For all other substances or wastes with the substances the tests listed below and described later must be included:

- (a) Constant concentration IC-50
- (b) "Recovery test"
- (c) "Growth test" on phytoplankton
- (d) Reproduction test
- (e) (Bio)-degradation test
- (f) Accumulation/elimination test

The tests, (except for the bio-degradation test) should be performed on the degradation products as well.

8. Other relevant information and data

Give any other relevant information, e.g. possibility of tainting; other sources of pollutants in the disposal area and all other information required by Annex III of the Convention.

9. Characteristics of proposed disposal area

Give the geographical limits of the proposed dumping area using co-ordinates. Give the depth and dynamics of the area, the characteristics of the sediments, etc. and any other information relevant to the selection of the area proposed for dumping, e.g. absence of spawning grounds, nursery areas, fishery activities, migratory routes, etc.

10. Overall assessment of the information

In this section bring together all the information gathered and set out the reasons why it is considered that a permit should be given.

11. Details of proposed dumping operation and proposed subsequent action

Give the conditions which will be imposed on the dumping operation, e.g. duration of licence, frequency of dumping, method of discharge, speed of vessel, whether or not containerized, supervision, etc. Finally give information on proposed post-operational monitoring which will be carried out.

ANNEX VII

INTERIM GUIDELINES FOR THE IMPLEMENTATION OF
PARAGRAPHS 8 AND 9 OF ANNEX I OF
THE LONDON DUMPING CONVENTION

A. Conditions under which Permits for Dumping of Wastes and
Other Matter containing Annex I Substances may be issued

1. Under Article IV(a) of the Convention, the dumping of waste or other matter containing substances listed in Annex I is prohibited, except that such prohibition does not apply to:

(a) Annex I substances which are rapidly rendered harmless by physical, chemical or biological processes in the sea (paragraph 8 of Annex I); or

(b) wastes or other materials, such as sewage sludges and dredged spoils, which contain matters listed in paragraphs 1 - 5 of Annex I as trace contaminants (paragraph 9 of Annex I).

2. A Contracting Party may issue a special or general permit for the dumping of waste containing an Annex I substance provided that the substance is determined to be rapidly rendered harmless or to be present as a trace contaminant and that the requirements of Annex II and Annex III have been met.

3. It is recognized that, for many of these wastes, practical alternative methods of treatment, disposal or elimination, or of treatment to render the matter less harmful for dumping at sea might be available on land and these alternative methods should be pursued as required by the Convention.

B. Evaluation of "Trace Contaminants" and "Rapidly Rendered Harmless"

4. In the context of paragraph 1(a), Annex I substances may be regarded as meeting the requirements of Annex I, paragraph 8, if tests of the waste or other matter proposed for dumping, including tests on the persistence of the material, show that the substances can be dumped so as not to cause acute or chronic toxic effects or bioaccumulation in sensitive marine organisms typical of the marine ecosystem at the disposal site. A persistent substance should not be regarded as harmless except when present as a trace contaminant.

5. In the context of paragraph 1(b), Annex I substances listed in paragraphs 1, 2, 3 and 5 of Annex I shall not be regarded as "trace contaminants" under the following three conditions:

(a) if they are present in otherwise acceptable wastes or other materials to which they have been added for the purpose of being dumped;

(b) if they occur in such amounts that the dumping of the wastes or other materials could cause undesirable effects, especially the possibility of chronic or acute toxic effects on marine organisms or human health whether or not arising from their bioaccumulation in marine organisms and especially in food species; and

(c) if they are present in such amounts that it is practical to reduce their concentrations further by technical means.

6. The procedures and tests described in the following sections are considered to apply equally to the interpretation of "harmlessness" (paragraph 8 of Annex I) and "trace contaminants" (paragraph 9 of Annex I).

C. Test procedures to be employed

7. Test procedures should be designed and run so as to provide evidence of the potential for acute or chronic toxic effects, the persistence of the material (where appropriate), inhibition of life processes, and bioaccumulation under the proposed disposal conditions.

8. For dredged spoils and sewage sludge the test procedures may not be needed if chemical characterization of the material and knowledge of the receiving area allows an assessment of the environmental impact.

9. The test procedures used should be:

(i) those described in Appendix I and, when appropriate,

(ii) those procedures acceptable to neighbouring States (in appropriate cases through a regional convention) which may be affected by the proposed disposal, including tests and effects on animals from the affected zone.

The Organization should be notified of the test procedures to be adopted by a Contracting Party.

D. Procedures for Consultation

10. When acceptable test procedures referred to in Section C are used and the results of tests show that the material is not persistent and would appear not to cause acute or chronic toxic effects or bioaccumulation in sensitive marine organisms typical of the marine ecosystem at the disposal site and especially in food species, and on human health, consultation with other Contracting Parties is not required. If such a permit is issued for other than sewage sludge or dredged material, notifiable particulars of the permit and the information required in Appendix II should be submitted immediately to the Organization for circulation to other Parties as information.

11. If the Contracting Party has doubts about the results of the tests referred to in paragraph 7 above, the Contracting Party should consult with the Organization, other Parties and international organizations as appropriate, as provided for under Article XIV, before issuance of the permit.

12. The Contracting Party intending to pursue the above consultation should submit to the Organization sufficient information to assist in determining whether the substances may be rapidly rendered harmless or are present in trace contaminants, including the information required in Appendix II.

13. The Organization, upon being informed by a Party that consultation is necessary, may:

(a) convene a Spécial Meeting of Contracting Parties in accordance with Article XIV(3)(a) of the Convention to consider the problems; or

(b) establish a Panel of Contracting Parties which could be convened or consulted by the Secretariat at short notice.

14. The Organization should, after consultation with other organizations, experts and Parties, make recommendations as to whether or not the waste in question may be dumped and, if so, on appropriate procedures which should be adopted by the Party prior to disposal.

15. The Contracting Party should inform the Secretariat of the actions taken following the recommendations of the Organization and, if a permit is issued, should notify the permit details to the Organization as well as any other information listed in Appendix II and not already notified under paragraph 12. The Organization shall circulate this information to other Parties.

16. Annual reports on dumping prepared by the Secretariat for circulation to the Contracting Parties should include a summary of permits for dumping of Annex I substances which have been issued in accordance with the consultation procedures of these Guidelines.

17. If a Contracting Party to the London Dumping Convention which is also a Party to a regional convention has followed a consultative procedure under a regional convention, such procedure may be substituted for the procedures set out in paragraphs 11 - 16 above. The Secretariat of the regional convention should inform the Organization of the result of the consultation which has taken place.

APPENDIX I

TEST PROCEDURES FOR THE INTERPRETATION OF "TRACE CONTAMINANTS" AND "HARMLESSNESS" IN REGARD TO ANNEX I, PARAGRAPHS 8 AND 9

I. GENERAL PROVISIONS

1. Each Contracting Party may develop and use individually or through a regional convention procedures as laid down in Section C of the Guidelines for the implementation of paragraphs 8 and 9 of Annex I to the London Dumping Convention.

2. Such test procedures may include, as appropriate, chemical characterization of the material, bioassays of the material, application of emission standards or environmental quality criteria in use by the Contracting Party, scientific literature or the results of field surveys of the proposed disposal site or a similar marine environment. For the initial evaluation of an industrial waste containing Annex I substances, the tests of paragraph 4 of this Appendix shall be used. Some of the tests may be augmented by new scientific developments, e.g. predictions from structure/activity relationships and environmental models.

3. Each Contracting Party should notify the Organization of the test procedures adopted and, upon request, should provide to the Organization or other Contracting Parties copies of those specific test procedures.

II. SPECIFIC CONSIDERATIONS

A. Test Procedures

4. Test procedures should include the following:

(a) acute toxicity tests on plankton, crustaceans or molluscs, and fish;

(b) chronic toxicity tests capable of evaluating long-term sublethal effects, such as bioassays covering an entire life cycle;

(c) tests to determine the potential for bioaccumulation of substances listed in Annex I and, if appropriate, the potential of elimination. The test organisms should be those most likely to bioaccumulate Annex I substances; and

(d) tests for determining the persistence of Annex I substances. Potential for degradability of Annex I substances should be determined using bacteria and water typical of the proposed dumping site. The tests should reflect the conditions at the dumping site.

B. Dilution and Dispersion of the Dumped Material

5. In applying the results of tests to predict the environmental impact of the proposed disposal, the method of disposal and the dilution of the waste that would result after dumping should be considered. The rate of dilution and dispersion actually occurring after dumping will depend on many factors, but will often include an initial period of rapid mixing and reduction of concentration of the dumped material followed by a period in which concentrations of the dumped material decrease at a much lower rate. In such cases the allowance for initial mixing should be based on the rate and time of the initial period of rapid mixing.

C. Chemical Characterization of the Dumped Material

6. Chemical characterization of wastes is required by Annex III. Chemical analysis of the liquid and solid phases of the wastes may be used to evaluate the potential for biological effects and persistence of Annex I substances in the dumped materials, where sufficient experience has been gained of the type of waste involved through test procedures or field surveys described in the relevant sections of this Appendix.

D. Application of the Results of Field Surveys

7. Data collected from field surveys of disposal sites may provide a direct measurement of the impact of Annex I substances on the marine environment.

8. Field survey data may be used as part of acceptable test procedures (see paragraph 2) when the following conditions are met:

- (a) The disposal site from which the data were collected is the same as that to be used for the proposed dumping, or is similar in environmental characteristics to the proposed disposal site;
- (b) The disposal site from which the data were collected has had wastes containing Annex I substances dumped there recently enough to cause impacts of the type listed in paragraph 1 of these Guidelines; and
- (c) The data collected are adequate to make a determination in regard to the impacts listed in paragraph 1 of these Guidelines.

APPENDIX II

BASIC INFORMATION TO BE PROVIDED FOR THE IMPLEMENTATION OF PARAGRAPHS 8 AND 9 OF ANNEX I OF THE LONDON DUMPING CONVENTION

INTRODUCTION

1. The purpose of the following procedures is to give guidance on the appraisal of such wastes for which dumping has to be considered and the presentation of the evidence in support of the proposal to dump. The test procedures advocated can only produce scientific evidence on which to base a decision. They are to some extent still experimental and experience is necessary as regards their practical application and the interpretation of the results. They cannot give conclusive proof that a substance is biologically harmless, especially in the longer term. Scientifically, such proof is impossible, the tests can only provide evidence for judging whether the environmental risk is acceptable or not.

REQUIRED INFORMATION

2. The following paragraphs draw attention to the more important aspects of the appraisal and set out the headings under which information is required:

Alternative disposal options

2.1 Itemize all of the alternative methods which have been considered and rejected, e.g. treatment, storage, destruction or disposal on land. Give the reasons for the rejection in each case.

Origin of waste

2.2 Give a description of the process from which the waste is derived to indicate the possible nature of the waste. It is not necessary to set out the process in detail.

Amount of waste

2.3 Give:

- (a) the total amount of waste expected to arise annually;
- (b) the frequency of dumping; and
- (c) the amount to be dumped on each occasion.

Form in which the waste is presented for dumping

2.4 State the form of the waste, quantify the maximum amount of solids present and give information on particle sizes.

Chemical composition

2.5 Give the chemical identification of compounds present in the liquid and solid phases and the quantification of these compounds. Specify the analytical methods used, including information on detection limits, precision and accuracy, as appropriate.

Physico/chemical characteristics

2.6 Give pH and other physico/chemical characteristics of the waste, e.g. specific gravity, volatility, solubility, and of its specific compounds.

Results of test procedures

2.7 Results of tests performed in accordance with Appendix I should be reported.

Other relevant information and data

2.8 Give any other relevant information, e.g. possibility of tainting; other sources of pollutants in the disposal area and all other information required by Annex III of the Convention.

Characteristics of proposed disposal area

2.9 Give the geographical limits of the proposed dumping area using co-ordinates. Give the depth and dynamics of the area, the characteristics of the sediments, etc. and any other information relevant to the selection of the area proposed for dumping, e.g. absence of spawning grounds, nursery areas, fishery activities, migratory routes, etc.

Overall assessment of the information

2.10 In this section bring together all the information gathered and set out the reasons why it is considered that a permit should be given.

Details of proposed dumping operation and proposed subsequent action

2.11 Give the conditions which will be imposed on the dumping operation, e.g. duration of licence, frequency of dumping, method of discharge, speed of vessel, whether or not containerized, supervision, etc. Finally give information on proposed post operational monitoring which will be carried out.

ANNEX VIII

CODE OF PRACTICE FOR THE DUMPING OF ACID WASTES FROM THE TITANIUM DIOXIDE INDUSTRY AT SEA

1. INTRODUCTION

Wastes generated by the titanium dioxide industry have recently been under scrutiny by a number of bodies (including SACSA (1) ICES (2) and the EEC(3)) and in particular detailed assessments of the environmental effects of the disposal of wastes from the sulphate process, primarily on the sea, have been undertaken.

Most recently, SACSA set up a Working Group to consider inter alia the scientific conclusions which could be drawn on the effects of the disposal of titanium dioxide wastes from the sulphate process at sea. A report was prepared and has been discussed within SACSA, and a code of practice based on the evidence presented in the report has been compiled to cover the disposal of these wastes at sea.

Much discussion has taken place within scientific and other circles on the relative merits of disposal at sea, disposal on land or by treatment processes which seek to recover all or part of the waste. It is not the intention of this code of practice to advise on the relative availability and environmental or economic practicality of other methods of disposal.

This document seeks to provide a framework within which marine disposals can be controlled to avoid detrimental effects on the marine environment in accordance with the Oslo Convention.

2. NATURE OF THE WASTES

SACSA(76) 3 revised, sets out the range of compositions of the wastes derived from the different stages of the sulphate process in the manufacture of titanium dioxide.

Stage 1 (digestion) which leaves ore residues which are insoluble and also ferrous sulphate which has crystallized on cooling. (Copperas).

Stage 2 (hydrolysis and washing) which gives rise to two acid streams (one strong at ca 20% H_2SO_4 , the other weaker at ca 5% H_2SO_4) both contaminated with metals present in the ore.

Although the quantities of the waste produced by each stage of the process vary with the type of ore used in the process, the quantities produced by the sulphate process are generally in the range:

insoluble residues	0.1 - 0.2 tonnes
Copperas	2 - 4 tonnes
"Strong" acid (20%)	6 - 8 tonnes
"Weak" acid (5%)	6 - 8 tonnes

It is common practice for the acid wastes and the copperas to be mixed together before disposal, giving rise to an acid waste with a high concentration of dissolved iron and some insoluble residues in suspension. Examples of concentrations found in practice are summarized below:

Range of concentrations of liquid discharges
from titanium dioxide manufacture

	<u>Dumped</u>	<u>Via Pipeline</u>
H ₂ SO ₄	10-25%	2.0-3%
FeSO ₄	1-14%	0.8-4%
Suspended Solids*	2- 3%	

*comprised mainly of TiO₂, SiO₂, Fe₂O₃, Al₂O₃, CaO, ZrO₂

Dissolved Metals

	<u>Conc. mg/l</u>	
Zn	1-125 mg/l)
Pb	3-6 mg/l	+)
Cr	4-225 mg/l)
Ni	4.50 mg/l) Correspondingly more
Mn	400-1400mg/l) or less dilute
As	.04-4 mg/l) depending on acid
Cd	0.1 mg/l) strength
Hg	.005 mg/l)
Cu	0.1-10 mg/l)
V	75-110 mg/l)

+ Recent measurement by the Federal Republic of Germany indicates a mean of 0.13 mg/l.

3. POTENTIALLY HARMFUL EFFECTS ARISING FROM THE DISCHARGE OF WASTES AT SEA

Certain components of the waste may be detrimental to marine life under certain conditions. These have been discussed in detail in SACSA(76) 3 and it is necessary to summarize these points here before considering the guidelines necessary for each parameter. On present evidence effects can arise from the following properties or components in the waste.

APPENDIX

AN EXAMPLE OF THE DERIVATION OF ACCEPTABLE DISCHARGE CONDITIONS FOR AN
ACID TITANIUM DIOXIDE WASTE

1. A representative sample of the waste is progressively diluted with sea-water to give the curve shown in figure 1 (figure 1 is a plot of pH vs waste concentration).
2. From figure 1 it is seen that a dilution of (813) is required to raise the pH of the receiving waters to 6.
3. The objectives of the vessel's discharge conditions are thus to ensure a minimum dilution in the wake of the vessel of (813) in the first five minutes.

4. Using the formula * $C_D Q_D = .003 V^{1.4} L^{1.6} t^{0.4} C_p$ where

C_D = waste concentration at discharge

Q_D = rate of discharge

V = speed of vessel

t = time after the waste has been dumped

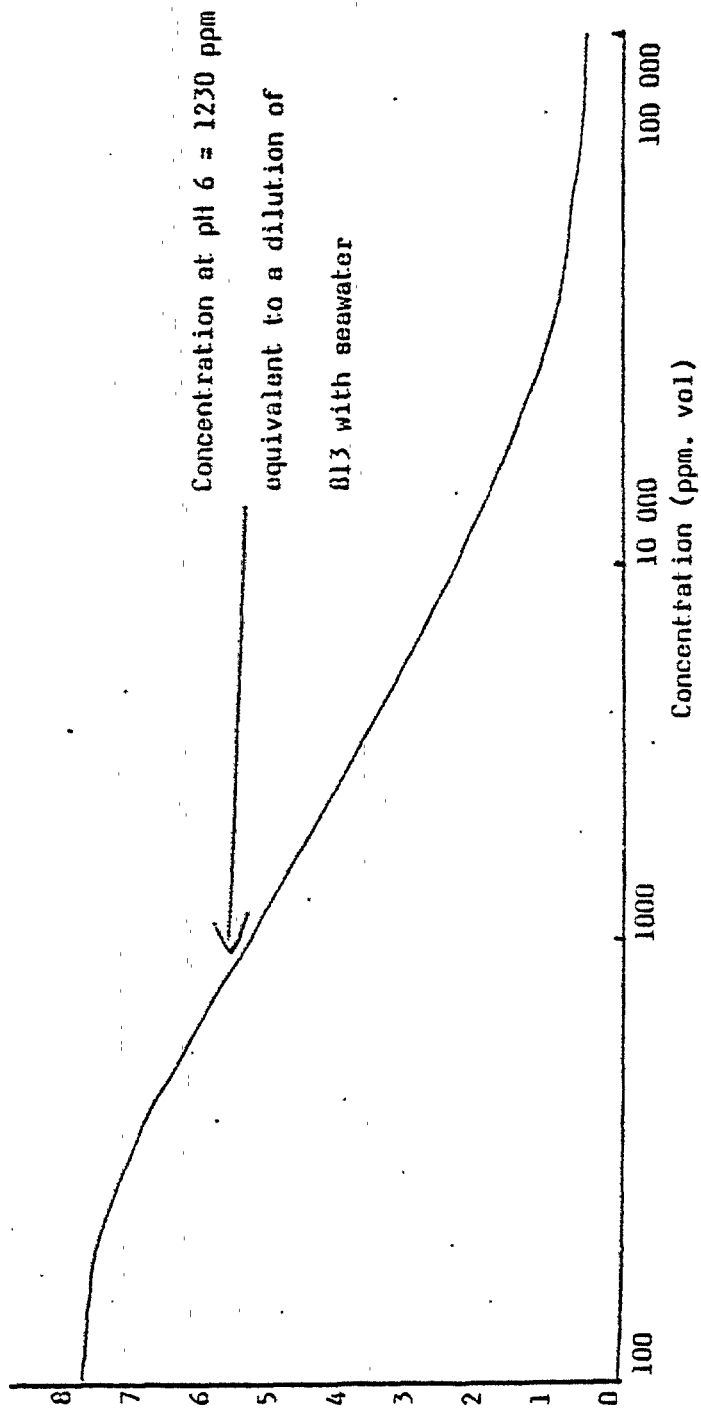
C_p = concentration of the waste in the wake at time t after discharge; and discharge is made into the boundary layer of the ship.

Since C_D/C_p is a dilution of 813 in this example, the rate of discharge (Q_D) required to reach this dilution in 300 seconds would be (for a ship of length 50m and a speed of dumping of 8 knots (4m/sec)):

$$C_D = \frac{.003 \times 4^{1.4} \times 50^{1.6} \times 300^{0.4}}{813} = 0.1314 \text{ m}^3/\text{sec} \text{ (593m}^3/\text{h)}$$

5. If twin discharge pipes are used, one on each side and a little forward of the propeller, the discharge rate may be increased by 50 per cent while achieving the same dilution.
6. Discharge conditions are thus set for the example above, operating at a maximum of 0.1314 m³/sec (0.197m³/sec for a twin discharge) for the vessel steaming at a speed of 4m/sec or more.
7. Alternatively, the dilution in the wake of the vessel may be established empirically using tracers.

* from IMCO Marine Environment Protection Committee 27 May 1975
MEPC 111/7



(a) Acidity: via a lowering of the pH of receiving waters to toxic levels.

(b) Iron Content: ferrous is oxidised to ferric giving a suspension of ferric hydroxide and using dissolved oxygen in the sea-water.

(c) Suspended solids: levels in receiving waters may be increased after discharge.

(d) Dissolved metals: levels in receiving waters may be increased after discharge.

(e) Changes in salinity and in the partial pressure of carbon dioxide may occur.

The control over the dumping of these wastes should be designed to ensure that detrimental effects on the marine environment are strictly limited. Control should include provisions for minimizing:

- the short-term effects which can occur in the first few minutes to few hours, due to acute toxicity and other transient factors such as oxygen depletion;
- the medium-term effects covering hours to days, which may arise due to the presence of the ferric hydroxide floc, suspended solids and from other persistent components;
- the possibilities of longer-term effects which may not be necessarily avoided by satisfactory control of the medium and short term effects.

Guidelines for the control of dumping which are designed to safeguard against these short- medium- and longer-term potential effects are set out below:

4. GUIDELINES FOR CONTROL OF DUMPING

4.1 Short-term effects

Although other minor chemical and physical changes to the receiving waters do occur when titanium dioxide is discharged from a vessel, the major chemical effect having a marked short-term biological effect is that of pH reduction. It was accepted in SACSA(76) 3 that, if measures are taken to achieve a sufficiently large initial dilution, the chemically detectable effects of reduction of pH, oxygen depletion, changes in the partial pressure of CO₂, elevation of suspended solids, elevation of dissolved metal levels and changes in salinity will have no detectable biological effect. Of these short-term effects, pH reduction is likely to be the most important. Guidelines are therefore based on the need to neutralize the waste's acidity extremely rapidly on discharge, by ensuring that the waste is diluted sufficiently in the turbulence of the vessel's wake.

In formulating the conditions under which discharge may be authorized, it is recommended that the pH of the receiving waters should reach pH 6 within a maximum of five minutes after discharge. Since the pH of the waste water will vary depending upon its source, and the dilution characteristics of the dumping vessels may differ (depending on their size, speed and position of discharge), it is not possible to define an acceptable discharge rate applicable to all cases. However, the following steps should be taken in establishing the authorized rate of discharge:

- (i) the pH, at various dilutions of the waste with the receiving waters should be established, giving a pH - dilution curve;
- (ii) from this, if the objective is to reach a pH of 6 or above in five minutes or less, it is possible to calculate the required dilution;
- (iii) by experimental work on the dumping vessel (using tracers) or from calculation (using general formulae for the minimum dilution in the wake of the vessel), the waste discharge rate can be established in relation to the required dilution. Alternatively, the pH of the diluted waste in the vessel's wake can be measured directly under the conditions of discharge. Steps should also be taken to ensure that the waste discharge does not penetrate the boundary layer behind the vessel.

This discharge rate should be the maximum one authorized and it is recommended that vessels dumping the waste should not be technically capable of discharging the waste at a higher rate than that authorized. It is also recommended that periodic checks be made on the waste composition to ensure that the dilution characteristics still fulfil the original objectives.

The pH of the diluted water in the vessel's wake should be periodically checked under the conditions of discharge.

A practical example of the steps needed to define the discharge rate is given in the Appendix.

The guidelines above assume that the dilution during the turbulent mixing in the wake of the dumping vessel will be sufficient to reduce the density difference between the sea-water/waste mixture and the receiving waters to a sufficiently low level to avoid density layering and subsequent inhibition of further mixing processes.

However, in cases where the waste density is higher than the average of approximately 1.2, discharge conditions should seek to reduce this density difference to less than 0.25 kg/m^3 .

It may also be necessary to consider additional restrictions on the rate of discharge where shallow waters are used and the scope for initial dilution consequently reduced.

4.2 Medium-Term Effects

The control of dumping titanium dioxide wastes must also recognize the possible medium-term effects arising from the suspension of iron hydroxide in the receiving waters as well as other suspended particles and dissolved metals. Although acute toxic effects are not expected if initial dilutions are such as to overcome the acute toxic effect of the acidity, the possibility of effects such as inhibition of photosynthesis occurring in the medium term should be considered and appropriate control measures taken.

The most effective way of ensuring that adverse biological effects do not result in the medium term is to ensure that the short-term mixing processes in the turbulent wake of the vessels are continued by natural dilution mechanisms, under all conditions, to disperse the conservative components of the waste over a wide area, hence achieving very great dilutions.

Since tidal current systems and their residuals operate continuously at all times (as opposed to weather-driven currents), the area of disposal should be carefully chosen to ensure that dispersion of the waste is maintained and that local high concentrations of the persistent components of the waste do not occur, as well as ensuring that the normal considerations in the selection of a dumping area defined in Annex III of the Oslo Convention are met. In particular, the importance of the area as regards other legitimate activities taking place in the marine environment must also be considered, with particular attention to migratory fish and marine mammals.

It is thus recommended that titanium dioxide wastes in large quantity should not be dumped in receiving waters where tidal currents are inadequate to transport the majority of the dumped material away from the area of dumping before a subsequent load is dumped. Seas with very low tidal flows may not be suitable for the disposal of large quantities of untreated titanium dioxide waste even if discharged in accordance with the guidelines set out in 4.1 and if the area were suitable on other grounds. Other areas should only be considered after hydrographic and sedimentological data allow the controlling authority to be satisfied that suspended particulates will be dispersed over a large area before settling out in concentrations that are biologically harmless.

4.3 Long-Term Effects

It is essential that, in addition to the control measures required above to ensure that acute effects are dissipated rapidly and that subsequent dispersion by tidal currents takes place, there should also be a safeguard against the possibility of unforeseen long-term effects occurring. With any dumping operation of titanium dioxide wastes there should be a continuing programme of monitoring the chemical, physical and biological parameters within the dumping ground and in the surrounding area.

A - Where the dumping operation is a new one, a baseline study of the area and its vicinity should be completed before dumping starts. It should establish:

- (i) the physical and chemical nature of the sediments;
- (ii) the concentrations of dissolved metals in the area;

- (iii) the abundance and diversity of benthic species;
- (iv) an index of the primary productivity of the area, e.g. of chlorophyll A density;
- (v) the hydrography of the area;
- (vi) the importance of the area for other uses.

B - After commencement of dumping, in accordance with the controls described in 4.1 and 4.2, subsequent surveys should seek, by reference to the baseline study, to establish:

(i) the extent of any physical or chemical change in the sediments or the water column. In particular, attention should be given to the extent of accumulation of iron and Cd, Zn, Pb, Cr, Ni, V in the sediments and to the extent of their elevation in the water column. This should be done at least every 3 years;

(ii) whether any changes identified in (i) of a physical or chemical nature are such as to cause biological effects in the sediments or water column including the possibility of accumulation of metals within marine organisms. This requires the repetition of the biological investigation of the baseline study at intervals of at most five years.

C - Where it is necessary to monitor the effects of a dumping operation which has been going on for some time and for which no baseline study is available, the controlling authority should seek to establish the same information as to the effects of the waste by other means. This may require the extension of the survey over a wider area to deduce whether or not the dumping area is anomalous in any respect and thence to consider whether this anomaly is attributable to dumping. These surveys should cover the same parameters as listed above for the baseline survey.

If the monitoring surveys lead the controlling authority to conclude that the dumping operation is having a significant adverse effect on marine life, then the controlling authority should take the necessary steps to remedy the situation, if necessary, by the cessation of dumping.

5. NOTIFICATIONS TO THE COMMISSION

The terms under which a permit is given for the disposal of any waste by dumping at sea are made available to the Oslo Commission. In the case of titanium dioxide it is recommended that a report on the results of any monitoring surveys carried out under the provisions of section 4.3 should be passed to the Commission every five years.

REFERENCES

1. SACSA(76) 3 revised: Report of Working Group on the Disposal of Wastes from the TiO₂ Industry 1976.
2. ICES Fishery Improvement Committee Report CM E: 52 1974
3. EEC Report ENV/47/75-E 23 July 1975

ANNEX IX

COUNCIL DIRECTIVE

of 20 February 1978

on waste from the titanium dioxide industry

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Articles 100 and 235 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

Having regard to the opinion of the Economic and Social Committee,

Whereas waste from the titanium dioxide industry is liable to be harmful to human health and the environment; whereas it is therefore necessary to prevent and gradually reduce pollution caused by such waste with a view to eliminating it;

Whereas the 1973 and 1977 European Communities' Programmes of Action on the Environment refer to the need to undertake Community action against waste from the titanium dioxide industry;

Whereas any disparity between the provisions on waste from the titanium dioxide industry already applicable or in preparation in the various Member States may create unequal conditions of competition and thus directly affect the functioning of the common market; whereas it is therefore necessary to approximate laws in this field, as provided for in Article 100 of the Treaty;

Whereas it seems necessary for this approximation of laws to be accompanied by Community action so that one of the aims of the Community in the sphere of protection of the environment and improvement of the quality of life can be achieved by more extensive rules; whereas certain specific provisions to this effect should therefore be laid down; whereas Article 235 of the Treaty should be invoked as the powers required for this purpose have not been provided for by the Treaty;

Whereas Directive 75/442/EEC, concerns waste disposal in general; whereas for waste from the titanium dioxide industry it is advisable to lay down a special system which will ensure that human health and the environment are protected against the harmful effects caused by the uncontrolled discharge, dumping or tipping of such waste;

Whereas in order to attain these objectives there should be a system of prior authorization as regards the discharge, dumping, storage, tipping or injecting of waste; whereas the issue of this authorization should be made subject to specific conditions;

Whereas discharge, dumping, storage, tipping and injecting of waste must be accompanied both by monitoring of the waste and monitoring and surveillance of the environment concerned;

Whereas for existing industrial establishments Member States must, by 1 July 1980, draw up programmes for the progressive reduction of pollution caused by such waste with a view to its elimination; whereas these programmes must fix the general reduction targets to be attained by 1 July 1987 at the latest and indicate the measures to be taken for each establishment;

Whereas for new industrial establishments Member States must issue a prior authorization; whereas such authorization must be preceded by an environmental impact study and may be granted only to firms which undertake to use only those materials, processes and techniques available on the market that are least damaging to the environment,

HAS ADOPTED THIS DIRECTIVE:

Article 1

1. The aim of this Directive is the prevention and progressive reduction, with a view to its elimination, of pollution caused by waste from the titanium dioxide industry.

2. For the purpose of this Directive:

(a) 'pollution' means the discharge by man, directly or indirectly, of any residue from the titanium dioxide manufacturing process into the environment, the results of which are such as to cause hazards to human health, harm to living resources and to ecosystems, damage to amenities or interference with other legitimate uses of the environment concerned;

(b) 'waste' means:

- any residue from the titanium dioxide manufacturing process of which the holder disposes or is obliged to dispose under current national legislation;

- any residue from a treatment process of a residue referred to in the first indent;

(c) 'disposal' means:

- the collection, sorting, transport and treatment of waste as well as its storage and tipping above ground or underground and its injection into the ground;

- the discharge thereof into surface water, ground water and the sea, and dumping at sea;

- the transformation operations necessary for its re-use, recovery or recycling;

(d) 'existing industrial establishments' means those industrial establishments already set up on the date of notification of this Directive;

(e) 'new industrial establishments' means those industrial establishments which are in the process of being set up on the date of entry into force of this Directive or which are set up after that date. Extensions to existing industrial establishments leading to an increase of 15 000 tonnes per year or more in the titanium dioxide on-site production capacity of the establishment concerned shall be treated as new industrial establishments.

Article 2

Member States shall take the necessary measures to ensure that waste is disposed of without endangering human health and without harming the environment, and in particular:

- without risk to water, air, soil and plants and animals;
- without deleteriously affecting beauty-spots or the countryside.

Article 3

Member States shall take appropriate measures to encourage the prevention, recycling and processing of waste, the extraction of raw materials and any other process for the re-use of waste.

Article 4

1. The discharge, dumping, storage, tipping and injection of waste are prohibited unless prior authorization is issued by the competent authority of the Member State in whose territory the waste is produced. Prior authorization must also be issued by the competent authority of the Member State

- in whose territory the waste is discharged, stored, tipped or injected;
- from whose territory it is discharged or dumped.

2. Authorization may be granted for a limited period only. It may be renewed.

Article 5

In the case of discharge or dumping, the competent authority may, in accordance with Article 2 and on the basis of the information supplied in accordance with Annex I, grant the authorization referred to in Article 4 provided that:

- (a) the waste cannot be disposed of by more appropriate means;
- (b) an assessment carried out in the light of available scientific and technical knowledge shows that there will be no deleterious effect, either immediate or delayed, on the aquatic environment;
- (c) there is no deleterious effect on boating, fishing, leisure activities, the extraction of raw materials, desalination, fish and shellfish breeding, on regions of scientific importance or on other legitimate uses of the waters in question.

Article 6

In the case of storage, tipping or injection, the competent authority may, in accordance with Article 2, and on the basis of the information supplied in accordance with Annex I, grant the authorization referred to in Article 4 provided that:

- (a) the waste cannot be disposed of by more appropriate means;
- (b) an assessment carried out in the light of available scientific and technical knowledge shows that there will be no detrimental effect, either immediate or delayed, on underground waters, the soil or the atmosphere;
- (c) there is no deleterious effect on leisure activities, the extraction of raw materials, plants, animals, on regions of special scientific importance or on other legitimate uses of the environment in question.

Article 7

1. Irrespective of the method and extent of treatment of the waste in question, its discharge, dumping, storage, tipping and injection shall be accompanied by the monitoring referred to in Annex II of the waste and of the environment concerned having regard to its physical, chemical, biological and ecological aspects.

2. The monitoring operations shall be carried out periodically by one or more bodies appointed by the Member State the competent authority of which has issued the authorization provided for in Article 4. In the case of cross-frontier pollution between Member States, the body in question shall be appointed jointly by the parties concerned.

3. Within one year of notification of this Directive, the Commission shall submit to the Council a proposal on the procedures for the surveillance and monitoring of the environments concerned. The Council shall act on this proposal within six months of the publication of the opinion of the European Parliament and that of the Economic and Social Committee in the 'Official Journal of the European Communities'.

Article 8

1. The competent authority in the Member State concerned shall take all appropriate steps to remedy one of the following situations and, if necessary, shall require the suspension of discharge, dumping, storage, tipping or injection operations:

(a) if the results of the monitoring provided for in Annex II(A) (1) show that the conditions for the prior authorization referred to in Articles 4, 5 and 6 have not been fulfilled, or

(b) if the results of the acute toxicity tests referred to in Annex II(A) (2) show that the limits laid down therein have been exceeded, or

(c) if the results of the monitoring provided for in Annex II(B) reveal a deterioration in the environment concerned in the area under consideration, or

(d) if discharge or dumping produces a deleterious effect on boating, fishing, leisure activities, the extraction of raw materials, desalination, fish and shellfish breeding, on regions of special scientific importance or on other legitimate uses of the waters in question, or

(e) if storage, tipping or injection produces a deleterious effect on leisure activities, the extraction of raw materials, plants, animals, on regions of special scientific importance or on other legitimate uses of the environments in question.

2. If several Member States are concerned, the measures shall be taken after consultation.

Article 9

1. Member States shall draw up programmes for the progressive reduction and eventual elimination of pollution caused by waste from existing industrial establishments.

2. The programmes mentioned in paragraph 1 shall set general targets for the reduction of pollution from liquid, solid and gaseous waste, to be achieved by 1 July 1987 at the latest. The programmes shall also contain intermediate objectives. They shall, moreover, contain information on the state of the environment concerned, on measures for reducing pollution and on methods for treating waste that is directly caused by the manufacturing processes.

3. The programmes referred to in paragraph 1 shall be sent to the Commission by 1 July 1980 at the latest so that it may, within a period of six months after receipt of all the national programmes, submit suitable proposals to the Council for the harmonization of these programmes in regard to the reduction and eventual elimination of pollution and the improvement of the conditions of competition in the titanium dioxide industry. The Council shall act on these proposals within six months of the publication of the opinion of the European Parliament and that of the Economic and Social Committee in the 'Official Journal of the European Communities'.

4. Member States shall introduce a programme by 1 January 1982 at the latest.

Article 10

1. The programmes referred to in Article 9(1) must cover all existing industrial establishments and must set out the measures to be taken in respect of each of them.

2. Where, in particular circumstances, a Member State considers that, in the case of an individual establishment, no additional measures are necessary to fulfil the requirements of this Directive, it shall, within six months of notification of this Directive, provide the Commission with the evidence which has led it to that conclusion.

3. After conducting any independent verification of the evidence that may be necessary, the Commission may agree with the Member State that it is not necessary to take additional measures in respect of the individual establishment concerned. The Commission must give its agreement, with reasons, within six months.

4. If the Commission does not agree with the Member State, additional measures in respect of that establishment shall be included in the programme of the Member State concerned.

5. If the Commission does agree, its agreement will be periodically reviewed in the light of the results of the monitoring carried out pursuant to this Directive and in the light of any significant change in the manufacturing processes or in environmental policy objectives.

Article 11

New industrial establishments shall be subject to applications for prior authorization made to the competent authorities of the Member State on whose territory it is proposed to build the establishments. Such authorizations must be preceded by environmental impact surveys. They may be granted only to firms which give an undertaking to use only such of the materials, processes and techniques available on the market as are least damaging to the environment.

Without prejudice to this Directive, Member States may adopt more stringent regulations.

Article 13

1. For the purposes of this Directive, Member States shall supply the Commission with all the necessary information relating to:

- the authorizations issued pursuant to Articles 4, 5 and 6,
- the results of the monitoring of the environment concerned carried out pursuant to Article 7,
- the measures taken pursuant to Article 8.

They shall also supply the Commission with general information concerning the materials, processes and techniques notified to them pursuant to Article 11.

2. Information acquired as a result of the application of this Article may be used only for the purposes of this Directive.

3. The Commission and the competent authorities of the Member States, their officials and other servants shall not disclose information acquired by them pursuant to this Directive and of a kind covered by the obligation of professional secrecy.

4. Paragraphs 2 and 3 shall not prevent publication of general information or surveys which do not contain information relating to particular undertakings or associations of undertakings:

Article 14

Every three years the Member States shall prepare a report on the prevention and progressive reduction of pollution caused by waste from the titanium dioxide industry and shall forward it to the Commission, which shall communicate it to the other Member States.

The Commission shall report every three years to the Council and the European Parliament on the application of this Directive.

Article 15

1. Member States shall bring into force the measures needed to comply with this Directive within 12 months of its notification and shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the texts of the national laws which they adopt in the field covered by this Directive.

Article 16

This Directive is addressed to the Member States.

Done at Brussels, 20 February 1978.

ANNEX 1

PARTICULARS WHICH MUST BE SUPPLIED IN ORDER TO OBTAIN THE PRIOR
AUTHORIZATION REFERRED TO IN ARTICLES 4, 5 AND 6

- A. Characteristics and composition of the matter:
1. total amount and average compositions of matter dumped (e.g. per year);
 2. form (e.g. solid, sludge, liquid or gaseous);
 3. properties: physical (e.g. solubility and density), chemical and biochemical (e.g. oxygen demand) and biological;
 4. toxicity;
 5. persistence: physical, chemical and biological;
 6. accumulation and biotransformation in biological materials or sediments;
 7. susceptibility to physical, chemical and biochemical changes and interaction in the environment concerned with other organic and inorganic materials;
 8. probability of production of taints or other changes reducing marketability of resources (fish, shellfish, etc.).
- B. Characteristics of dumping or discharge site and methods of disposal:
1. location (e.g. coordinates of the dumping or discharge area, depth and distance from the coast), location in relation to other areas (e.g. amenity areas, spawning, nursery and fishing areas and exploitable resources);
 2. rate of disposal per specific period (e.g. quantity per day, per week, per month);
 3. methods of packaging and containment, if any;
 4. initial dilution achieved by proposed method of release, particularly the speed of the ship;

5. dispersal characteristics (e.g. effects of currents, tides, and wind on horizontal transport and vertical mixing);
 6. water characteristics (e.g. temperature, pH, salinity, stratification, oxygen indices of pollution - dissolved oxygen (DO), chemical oxygen demand (COD), biochemical oxygen demand (BOD), nitrogen present in organic and inorganic form, including ammonia, suspended matter, other nutrients and productivity);
 7. bottom characteristics (e.g. topography, geochemical and geological characteristics and biological productivity);
 8. existence and effects of other dumpings or discharges which have been made in the area concerned (e.g. heavy metal background reading and organic carbon content).
- C. Characteristics of the tipping, storage or injection area and disposal methods:
1. geographical situation;
 2. characteristics of adjacent areas;
 3. methods of packaging and containment, if any;
 4. characteristics of the methods of tipping, storage and injection, including an assessment of precautions taken to avoid the pollution of waters, the soil and the atmosphere.

ANNEX II

SURVEILLANCE AND MONITORING OF DISPOSAL

A. Monitoring of waste

Disposal operations shall be accompanied by:

1. checks on the quantity, composition and toxicity of the waste to ensure that the conditions for prior authorization referred to in Articles 4, 5 and 6 are fulfilled;
2. tests for acute toxicity on certain species of molluscs, crustaceans, fish and plankton, preferably species commonly found in the discharge areas. In addition, tests shall be carried out on samples of the brine shrimp species (Artemia salina).

Over a period of 36 hours and at an effluent dilution of 1/5 000, these tests must not reveal:

- more than 20% mortality for adult forms of the species tested,

- and for larval forms, mortality exceeding that of a control group.

B. Surveillance and monitoring of the environment concerned

- I. In the case of discharge into fresh water or into the sea or in the case of dumping, such checks shall relate to the three following items: water column, living matter and sediments. Periodic checks on the state of the area affected by the discharges will make it possible to follow the development of the environments concerned.

Monitoring shall include the determination of:

1. pH;
2. dissolved oxygen;
3. turbidity;
4. hydrated iron oxides and hydroxides in suspension;
5. toxic metals in water, suspended solids, sediments and in accumulation in selected benthic and pelagic organisms;
6. the diversity and the relative and absolute abundance of flora and fauna.

- II. In the case of storage, tipping or injection the monitoring shall include:

1. tests to ensure that surface waters and ground waters are not contaminated. These tests shall include the measurement of:
 - acidity,
 - iron content (soluble and particulate),
 - calcium content,
 - toxic metal content (soluble and particulate) if any;
2. where necessary, tests to determine any adverse effects on the structure of the subsoils;
3. a general assessment of the ecology of the area in the vicinity of the tipping, storage or injection point.