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Meeting of Experts on Pollutants from Land-Based Sources

Geneva, 19 - 24 September 1977

Réunion d'experts sur les polluants d'origine tellurique

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Pollutants from Land-Based sources in the Mediterranean: Radioactivity Releases into the Sea

The attached document, which is the report of a WHO consultation, is distributed to participants for their information.

Pollutants d'origine tellurique dans la Méditerranée: rejets radioactifs dans la mer

Le présent document, qui est un rapport d'une consultation de l'OMS, est distribué aux participants pour information.

Coordinated Mediterranean Pollution Monitoring and
Research Programme

POLLUTANTS FROM LAND-BASED SOURCES IN THE MEDITERRANEAN:
RADIOACTIVITY RELEASES INTO THE SEA

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WORLD HEALTH ORGANIZATION

Geneva, 1977

Coordinated Mediterranean Pollution Monitoring and
Research Programme

POLLUTANTS FROM LAND-BASED SOURCES IN THE MEDITERRANEAN: RADIOACTIVITY RELEASES INTO THE SEA

Report of a WHO Consultation
Monaco, 27 - 29 July 1977

WORLD HEALTH ORGANIZATION

Geneva, 1977

Note

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CONTENTS

I. INTRODUCTION

1. The Meeting was opened by Dr E. Komarov, Control of Environmental Pollution and Hazards, Division of Environmental Health, WHO. He welcomed the participants (see list of participants: Appendix 1) and thanked the Head of IAEA's International Laboratory of Marine Radioactivity for providing the facilities for holding the Meeting. He pointed out that WHO hoped that the Meeting would be able to reach agreement on a draft statement of policy, from the viewpoint of public health, with regard to radioactive discharges into the sea, with particular reference to the Mediterranean as the Meeting had been organized within the framework of the United Nations Environment Programme's Mediterranean Action Plan. Proposals for future programmes and policies in this field would prove helpful. He noted that the deliberate dumping of radioactive wastes from ships should be excluded from the discussions; no such dumping was in any case contemplated in the Mediterranean.

2. It was also expected that the Meeting would be able to reach agreement on the provisions pertaining to radioactive substances in the Proposed Technical Annexes to the draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources. Mr Fluss (WHO) explained the role of the Organization in the preparation of this Protocol, and its current position (initial intergovernmental consultations on the Protocol had taken place in Athens on 7-11 February 1977; detailed discussions on the Technical Annexes were scheduled to be held in WHO at a meeting of government experts on 19-24 September 1977; the next round of negotiations on the draft Protocol would take place at an intergovernmental consultation in Venice on 17-21 October 1977). It would prove most useful if the present Meeting could reach a consensus of such a nature as to avoid the need for reconsideration of radioactive substances at the September meeting. Dr E. Komarov acted as Secretary and Dr G.A. Webb as Rapporteur of the Consultation.

3. A general exchange of views took place on the overall significance of the problem of man-made sources of radioactivity in the marine environment, with particular reference to the Mediterranean. It was agreed that at present radioactivity constituted less of a public health problem than certain other contaminants (persistent oils, chemicals, etc.) currently being discharged. The Group agreed that it would be inappropriate to consider the dumping problem, and that the discussions would deal only with the discharge of radioactivity into the marine environment from land-based sources. In this connection, the participants noted with considerable interest the document that had been prepared by J.R. Grover (Waste Management Section, Division of Nuclear Safety and Environmental Protection, IAEA) entitled "Radioactive discharges into the Mediterranean Sea". It was emphasized by one of the representatives of the IAEA that this document was a draft, and was subject to review by the countries participating in the project on pollutants from land-based sources in the Mediterranean (project MED X).

4. There was also a discussion of some of the information contained in other documents presented to the Meeting (list of documents: Appendix 2). The Meeting decided to divide into two groups, which were assigned the task of drafting conclusions and recommendations. The conclusions and recommendations were then discussed in detail by all participants, and were accepted by the Meeting, as follows.

II. EVALUATION OF RADIOACTIVE DISCHARGES INTO THE SEA

5. It is a well-established principle that the release of radioactive material to the environment should be kept as low as readily achievable, economic and social considerations

As for local effects, the collective dose must be taken into consideration.

13. Radionuclides are transported by river water to the sea (or discharged directly into the sea) in two different forms:

- in solution;
- as transportable solid particles with characteristics depending upon the type of particles with which the radioactivity is associated.

In the first form, radionuclides behave according to the hydrographic conditions, while in the second form they are also influenced by sedimentation. However, the distribution between the two fractions may change with the physico-chemical characteristics of the water (contribution of organic matter, discharges from conventional industries, etc.) and with time (aging of Fe, Pu, Ru, etc.).

The ratio between the radioactive and stable isotopes of a particular element will usually be the same after concentration in a marine organism as it was in the water.

The definition of concentration factors for radioactive elements through food chains is a complex matter in that local environmental aspects such as time of the year, marine species present, oceanographic conditions, etc. have to be considered in each case.

14. The limits for radioactive exposure established for man are, in general, sufficient to ensure the protection of marine life. This is in contrast to most other sources of pollution, where direct protection of marine life is essential.

For radioactive discharges into the sea, the control of the level of radioactivity may then be based on the levels of radioactivity in marine species representing typical food for man. The selection of control species must be made on the background of local knowledge of nutrition and the general view that the selected species should reflect different biotopes.

IV. ASSESSMENT OF DOSES ASSOCIATED WITH RADIOACTIVITY DISCHARGED INTO THE SEA

15. Grover's paper can be cited as an example of a calculation of the amount of radioactivity being discharged into the sea. He states that in the case of the Mediterranean the total discharge of radioactivity from nuclear installations is very low, and that much larger amounts of radioactivity are present due to radioactive contaminants in other materials and, above all, due to fallout from weapons tests. Grover affirms that, given the fact that short-lived isotopes give rise only to local effects, the major contribution to the overall radioactivity in the Mediterranean comes from long-lived isotopes (this contribution adds about 0.2-0.4% to the quantitites already present). However, in order to have a realistic evaluation of the impact on man of radioactive discharges from land-based sources, it will be necessary to calculate the doses corresponding to the amounts of "natural" and "artificial" radioactivity present in the sea. In any event, even if such data are not currently available, it is evident that doses due to artificial sources represent a very small fraction of those due to natural radioactivity, taking into account the absolute values of the respective quantities of activity involved (as reported by Grover).

V. ACCIDENTAL RELEASES OF RADIOACTIVITY

16. The Group discussed the problems which might arise as a result of accidental releases of radioactivity into the sea. It was considered that adequate provision for notification, monitoring, and corrective action is made in the Protocol Concerning Co-operation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency.

VI. REGULATORY ASPECTS

17. It is clearly implied in the draft Protocol (Appendix 3) that discharges of radioactive matter must be carefully controlled and must be subject to authorization by competent authorities. This implies that countries should have the appropriate legal, statutory, and administrative framework to enable this procedure to be carried out. It would appear reasonable that the expertise of appropriate international organizations could be used to suggest how such frameworks could be set up in countries where they do not already exist.

18. The Group noted the fact that WHO, the IAEA, and the NEA were currently engaged in the collection and dissemination of information on national legislation pertaining to radioactive waste management. This activity should be encouraged since the information provided could be of assistance to Governments in framing legislation confirming to the requirements of the relevant international conventions and agreements and to national conditions.

19. The Group recommended that the authorities assigned responsibility for regulating radioactive waste discharges should ensure that adequate consideration be given to both public health and environmental protection aspects; this would necessitate appropriate consultations with the Government agencies concerned.

VII. SUGGESTED ACTION

20. Before authorizing any releases, the environmental capacity must be determined and used, together with other factors (economic, political, etc.), to arrive at the stipulated capacity.

21. The Group recommended that further research and collection of hydrographic, radioecological, and chemical data (needed for environmental capacity calculations and modelling) should be carried out.

22. The results of measurements of individual radionuclides in effluents discharged from nuclear installations (industrial and research) and certain non-nuclear establishments should be collected and evaluated in order to assess their relative importance. Environmental control procedures around existing nuclear plants should be implemented in such a way as to obtain information on the short-term environmental impact. It would also be desirable to establish environmental control programmes in order to assess the environmental impact of some of the non-nuclear plants discharging the largest amounts of radioactivity (e.g. fertilizer plants).

23. It would be very desirable to establish a coordinated sampling, measuring, and reporting system to be used by all the Mediterranean countries in order to facilitate the interpretation of results and the maintenance of an inventory of radioactive releases into the Mediterranean. The measuring data would be submitted periodically to an inter-comparison programme.

24. When taking samples for radioactivity measurement in the environment, it should be borne in mind that the samples may also be used for measuring other substances of environmental concern.

25. It would be desirable for UNEP, WHO and the IAEA to initiate a joint project to study environmental radioactivity in the Mediterranean, having regard to the expansion of the nuclear industry in the coastal States.

VIII. CONCLUSIONS AND RECOMMENDATIONS RELATING TO THE DRAFT PROTOCOL FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST POLLUTION FROM LAND-BASED SOURCES (APPENDIX 3)

VIII. A Explanatory notes

26. The Group considered that the dumping of packaged solid radioactive wastes was effectively covered by existing or pending international agreements. It therefore did not consider this aspect further but confined its deliberations to discharges of liquid wastes, including suspensions and slurries.

27. In the case of radioactivity, as for other pollutants, it is not the concentration or specific activity which indicates the level or harm, rather it is the quantity of radioactivity discharged together with the environmental conditions. For this reason, it is more reasonable to delete radioactivity of any particular concentration from Annex I to the draft Protocol (Appendix 4) and include all radioactive materials in Annex II to the draft Protocol (Appendix 5) so that all discharges will be subject to the strict control procedures required in that Annex and in Annex III to the draft Protocol (Appendix 6). This change would bring the draft Protocol into agreement with the Paris Convention for the Prevention of Marine Pollution from Land-Based Sources (this Convention was opened for signature at Paris on 4 June 1974; the relevant extracts from the Convention are annexed as Appendix 7).

28. All radioactive wastes and other matter as defined in item 10 of Annex II, referring to Principle 5, should be subject to control and authorization of discharges. The authorization procedure appearing in square brackets as Principle 5(b) should be implemented for all radioactive discharges. When determining the appropriate authorized level of discharges, national authorities should collectively take into account the optimization procedures recommended by ICRP (ICRP Publications 22 and 26). Practical guidance on these matters will be found in a forthcoming publication to be issued by the IAEA.[1]

29. There is some inconsistency between Annexes I and II to the draft Protocol. In particular, many substances listed in Annex II may, for example, be carcinogenic. The inclusion of item 8 under Annex I is not therefore consistent with the division of substances between Annexes I and II. The Group proposed the deletion of item 8, and the inclusion of the important criteria in the preamble under paragraph A. The wording of the first sentence has been changed to clarify the point that not all the criteria apply to item 7.

VIII. B Recommendations

30. The following changes related to the draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources were recommended:

Principles: - No change

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[1] International Atomic Energy Agency (1977) Procedures for establishing limits for the release of radioactive materials into the environment, Vienna (in press).

Annex I:
(Appendix 4 to this report)

- The first sentence of A should be change to read as follows: "The following harmful substances and materials are selected on the basis of one or more of the following properties:".
- Insert between "toxicity" and "persistence" the words "carcinogenicity, teratogenicity, mutagenicity".
- Delete items 8 and 9.

Annex II:
(Appendix 5 to this report)

- Item 10: Remove the square brackets and substitute for the existing words "Radioactive wastes and other radioactive matter".

Annex III:
(Appendix 6 to this report)

- Add the following item to C:

  7. Synergistic and cumulative effects of multiple sources of discharge.

As a consequence of these recommendations, a corresponding number of changes are required in document UNEP/WG.11/INFO 5.

The Group expressed the view that the survey suggested in paragraph 10 and elaborated in paragraph 13 of the said UNEP document is not necessary in the case of radioactive materials since their characteristics have been extensively documented in publications of international bodies such as IAEA, ICRP, OECD (NEA), UNSCEAR, WHO, etc.[1]

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1 See, for example, the list of references appended to "Health Implications on Nuclear Power Production", Report of a Working Group, Brussels, 1-5 December 1975, WHO, Copenhagen.

APPENDIX 1

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APPENDIX 2

LIST OF DOCUMENTS

- Grover, J.R. (1977) Radioactive Discharges into the Mediterranean Sea, Vienna, IAEA (unpublished draft document)

- Water Quality Bulletin, 1977, Vol. 2, No. 2

- United Nations Environment Programme (1977) Preparation of a survey of characteristics and environmental impact of substances relevant to the draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, Geneva (unpublished document UNEP/WG.11/Info. 5)

- United Nations Environment Programme (1977) Report of Intergovernmental Consultation Concerning a draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, Athens, 7-11 February 1977, Geneva (unpublished document UNEP/IG.6/6)

- United Nations Environment Programme (1977) The Mediterranean Action Plan. Information on the Activities of the United Nations Environment Programme for the Protection and Development of the Mediterranean Region, Geneva (unpublished document GE.77-5355)

- World Health Organization (1977) Revised Annexes to draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, Geneva (unpublished document)

- Convention for the Prevention of Marine Pollution from Land-Based Sources (the Paris Convention, open for signature at Paris on 4 June 1974) (Article 5 and Part III of Annex A)

APPENDIX 3

PRINCIPLES RECOMMENDED FOR INCLUSION IN THE DRAFT PROTOCOL FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST POLLUTION FROM LAND-BASED SOURCES[1]

Principle 1. General obligation

The Contracting Parties to this Protocol (hereinafter referred to as "the Parties") should take all appropriate measures to prevent, abate and combat pollution of the Mediterranean Sea Area caused by discharges from rivers, coastal establishment or outfalls, or emanating from any other land-based sources within their territories.

Principle 2. Scope and geographical coverage

(a) The area to which this Protocol applies (hereinafter referred to as the "Protocol Area") should be the Mediterranean Sea Area as defined in article 1 of the Convention and should include the [territorial seas and] waters on the landward side of the base lines from which the breadth of the territorial sea is measured, extending, in the case of watercourses, up to the freshwater limit. "Freshwater limit" means the place in the watercourse where, at low tide and in a period of low freshwater flow, there is an appreciable increase in salinity due to the presence of sea-water.

(b) The Protocol should apply to all polluting discharges reaching the Protocol Area from the territories of the Parties:

(i) directly from the coast through coastal dumping or from coastal establishments or outfalls;

(ii) through run-off from land;

(iii) through rivers, canals and other watercourses;

[(iv) from man-made off-shore structures which are under the jurisdiction of a Party and which serve purposes other than the exploration and exploitation of mineral resources in the sea;]

[(v) through the atmosphere (wherever this is specified in the Protocol or in any annex thereto).]

Principle 3. Reduction of pollution from existing sources

The Parties should undertake to elaborate and adopt programmes for the progressive reduction of pollution from existing land-based sources which will lead to an improvement in the quality of the environment and which will take place according to a time-table agreed upon by the Parties.

(a) The Parties should undertake to adopt strict measures in order to eliminate pollution of the Protocol Area from land-based sources by the substances listed in annex I. To this end they should elaborate, jointly or individually as appropriate, programmes and measures capable of leading to such elimination, if necessary in stages.

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[1] These Principles are in the form revised by the Intergovernmental Consultation Concerning the draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, held in Athens on 7-11 February 1977 (Annex II to document UNEP/IG.6/6). Only those Principles which are relevant to the present report are reproduced here.

(b) The Parties should, within a period of ... years from the data of entry into force of this Protocol, prepare and adopt a time-table for the application of standards for emissions and/or standards of use as appropriate. The standards and time-table would be fixed by common agreement and periodically reviewed for each of the substances of annex I.

Principle 5. Substances listed in annex II

(a) The Parties should combat and strictly limit pollution from land-based sources in the Protocol Area by substances listed in annex II and should elaborate, jointly or individually as appropriate, programmes and implement measures towards this end.

(b) All discharges should be made subject to the issue of an authorization by the competent national authorities, which will take into account the criteria laid down in annex III.

Principle 6. Special guidelines, criteria or standards

(a) The Parties should progressively elaborate and adopt, in co-operation with the competent international organizations, common guidelines, criteria or standards dealing, inter alia, with:

(i) the length, depth and position for coastal outfalls;

(ii) special requirements for separate treatment of hazardous types of sewage, such as sewage from hospitals and industrial wastes which may be harmful to man or living resources or which may create difficulties for the biological treatment of municipal waste waters;

(iii) quality of waters used for specific purposes and necessary for the protection of human health (fish and shellfish, bathing water), of living resources (fisheries, fishing activities, aquaculture) and of ecosystems;

(iv) a control and progressive replacement of products, installations and industrial and other processes contributing significantly to water pollution either directly or through rivers or the atmosphere;

(v) special requirements concerning the quantities of discharges of substances referred to in Principles 4 and 5, the concentration of such substances in effluents and the methods of discharging them.

(b) Without prejudice to the provisions of Principle 4, such guidelines, criteria or standards should take into account subregional features, local geographical and physical characteristics, the economic capacity of States and their need for economic development, the level of existing pollution and the local environmental capacity of the marine environment.

They may be adopted either in the form of recommended practices or in the form of provisions to be incorporated in annexes to the Protocol.

Principle 7. Discharges from new installations

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Principle 8. Specially protected areas

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Principle 9. Monitoring

Within the framework of the monitoring programmes provided for in article 10 of the Convention, and if necessary in co-operation with the competent international bodies, the Parties should implement at the earliest possible date monitoring activities to ensure:

- as far as possible, systematic assessments and periodic information on the levels of pollution along their coasts, in particular with regard to the substances listed in annexes I and II;

- an evaluation of measures for the reduction of marine pollution taken under the present Protocol.

Principle 10. Scientific and technological co-operation

In conformity with article 11 of the Convention, the Parties should undertake to co-operate as far as possible in fields relating to science and technology related to pollution from land-based sources, including research on inputs, pathways and effects of pollutants and on the development of new methods for treatment, disposal and reduction. To this end the Parties should, in particular, endeavour to:

(i) exchange scientific and technical information;

(ii) co-ordinate their research programmes.

Principle 11. Training and assistance

[The parties should, as far as possible, directly or if necessary with the assistance of regional organizations or qualified internationsl organisations:

(a) Promote programmes of assistance for developing countries in the fields of science, education, technology etc., with a view to preventing pollution from land-based sources and its harmful effects on the environment.

(b) Such technical assistance could, on a favourable financial basis, cover for example the training of scientific and technical personnel, and the acquisition, utilization and production by the countries themselves of appropriate equipment.]

Principle 12. Watercourses shared by several States

(a) If the discharge from a watercourse which flows through the territories of two or more Parties or forms a boundary between them is liable to cause pollution of the marine environment of the Protocol Area, the Parties concerned should endeavour to take appropriate measures in common in order to prevent, abate and combate as far as possible such pollution.

(b) The provisions of the Protocol may not be invoked against a Party to the extent that the latter is prevented, as a result of pollution having its origin in the territory of a non-contracting State, from ensuring their full application.

Principle 13. Discharge affecting other Parties

(a) Each Party should ensure at all times that discharges of wastes from its territory do not prejudice the interests of one or more of the other Parties and should, whenever necessary for this purpose or whenever requested by any other Party concerned, enter into mutual consultation with a view to reaching an agreed solution.

(b) At the request of any Party concerned, the question should be considered at the next meeting of the Parties, which may make recommendations with a view to reaching a satisfactory solution.

Principle 14. Exchange of information

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Principle 15. Meetings of the Parties

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Principle 16. Annexes and amendments to annexes

.....

Principle 17. Final clauses

.....

APPENDIX 4
ANNEX I

A. The following harmful substances and materials are selected mainly on the basis of their

- toxicity
- persistence
- bioaccumulation

with the exception of those which are biologically harmless or which are rapidly converted into biologically harmless substances. They are listed for the purpose of Principle 4 of the Protocol which requires strict measures for their elimination from land-based sources.

1. Organohalogen compounds and compounds which may form such substances in the marine environment.

2. Organophosphorus compounds and compounds which may form such substances in the marine environment.

3. Organotin compounds and compounds which may form such substances in the marine environment.

4. Mercury and mercury compounds.

5. Cadmium and cadmium compounds.

6. Persistent mineral oils and persistent hydrocarbons derived from petroleum origin.

7. Persistent synthetic materials which may float, sink or remain in suspension and which may interfere with any legitimate use of the sea.

8. Substances which possess proven carcinogenic, teratogenic or mutagenic properties in or through the marine environment.

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

B. This Annex applies to all wastes from land-based sources, including municipal and industrial discharges as well as any other point and non-point sources with the exception of those which contain the substances referred to in section A as trace contaminants only. The discharge of such wastes shall be subject to the provisions of Annexes II and III as appropriate.

APPENDIX 5
ANNEX II

A. The following waste substances and materials are selected mainly because they may endanger human health or marine organisms or may have other adverse effect on the marine environment although these effects may be limited to the coastal water zone receiving such wastes. One or more of the following criteria may justify their inclusion:

- toxicity
- persistence
- bioaccumulation
- adverse synergistic effects
- deleterious organoleptic effects on edible marine organisms
- reduction of amenities
- adverse effects on the oxygen balance
- impairment of other legitimate uses of the sea

Waste substances are listed hereunder for the purpose of Principle 5 of the Protocol which requires strict limitation of their discharges from land-based sources.

1. The following elements and their compounds:

1.	zinc	6.	selenium	11.	tin	16.	vanadium
2.	copper	7.	arsenic	12.	barium	17.	cobalt
3.	nickel	8.	antimony	13.	beryllium	18.	thallium
4.	chromium	9.	molybdenum	14.	boron	19.	tellurium
5.	lead	10.	titanium	15.	uranium	20.	silver

2. Biocides and their derivatives not covered in Annex I.

3. Organosilicon compounds and compounds which may form such substances in the marine environment excluding those which are biologically harmless or are rapidly converted into harmless substances.

4. Non-persistent mineral oils and non-persistent hydrocarbons derived from petroleum origin.

5. Cyanides and fluorides.

6. Non-biodegradable detergents and other surface-active substances.

7. [Inorganic compounds of phosphorus and elemental phosphorus].

8. Pathogenic micro-organisms which are liable to endanger human health or marine organisms or to impair other legitimate uses of the sea because of their concentrations of the marine environment and the coastal waters in particular.

9. [Waste heat releases].

10. [Radioactive wastes and other radioactive matter not covered in Annex I].

11. Any other known or new waste substances and materials which are likely to produce deleterious environmental effects as described above but are not listed under items 1 to 10.

B. This Annex applies to all wastes from land-based sources, including municipal and industrial discharges as well as any other point and non-point sources with the exception of those which contain the substances referred to in section A as trace contaminants only. The discharge of such wastes shall be subject to the provisions of Annexes III as appropriate.

APPENDIX 6
ANNEX III

According to Principle 5 of the Protocol, the factors to be considered in establishing criteria governing the issue of an authorization for the discharge of wastes containing substances referred to in Annex II include:

A. Characteristics and composition of the waste

A general characterization of wastes provides for their classification and assessment of potentially harmful properties:

1. Type and size of waste source (industrial process etc.).

2. Type and waste (origin, average composition).

3. Form of waste (solid, liquid, sludge, slurry).

4. Total amount (volume, e.g. per year).

5. Discharge pattern (continuous, intermittent, seasonal variations, etc.).

6. Concentrations with respect to major constituents, substances listed in Annex I, substances listed in Annex II, and other substances as appropriate.

7. Physical, chemical and biochemical properties of the waste.

8. Presence of pathogenic micro-organisms.

B. Characteristics of potentially harmful waste constituents

The potential harmfulness of specific waste constituents requires individual evaluation in the light of actual concentrations and amounts discharged:

1. Persistence (physical, chemical, biological) in the marine environment.

2. Toxicity and other harmful effects.

3. Accumulation in biological materials or sediments.

4. Biochemical transformation rendering harmful compounds.

5. Susceptibility to physical, chemical and biochemical changes and interaction in the aquatic environment with other sea-water constituents, which may produce harmful biological or other effects on any of the uses listed in section E below.

C. Characteristics of discharge site and receiving water

The local conditions of the water into which the wastes are discharged require consideration with regard to the following:

1. Hydrographic, meteorological, geological and topographical conditions of the coastal area.

2. Location of the waste discharge (outfall, canal, outlet, etc.) and its location in relation to other areas (e.g. amenity areas, spawning, nursery and fishing areas, shellfish grounds).

3. Initial dilution achieved at the point of waste release.

4. Dispersion characteristics (e.g. effects of currents, tides and wind on horizontal transport and vertical mixing).

5. Water characteristics with respect to physical, chemical, biochemical, biological and ecological conditions in the discharge area.

6. Capacity of the receiving water to absorb waste discharges without undue effects.

D. Availability of waste treatment technology

The method of waste treatment and discharge should be selected with the following considerations taken into account:

1. Availability of alternative methods for reuse or disposal of waste-waters on land.

2. Feasibility of alternative methods for municipal sewage treatment and disposal and for combined treatment of industrial and domestic wastewaters.

3. Acceptable methods for disposal of waste treatment residuals on land.

4. Availability of specific treatment processes for hazardous industrial waste constituents or for their transformation into substances less harmful for discharge into the sea.

E. Potential impairment of sea-water uses

An assessment of the possible impact of waste discharges on the following uses of the sea and the coastal waters is required:

1. Effects on human health through pollution impact on:

   (a) fish and shellfish;

   (b) bathing waters;

   (c) aesthetics.

2. Effects on living resources, in particular on:

   (a) fisheries;

   (b) fishing activities;

   (c) aqua culture;

   (d) others, including birds and mammals.

3. Effects on marine ecosystems.

APPENDIX 7

CONVENTION FOR THE PREVENTION OF MARINE POLLUTION FROM LAND-BASED SOURCES (THE PARIS CONVENTION) (ARTICLE 5 AND PART III OF ANNEX A)[1]

"Article 5

1. The Contracting Parties undertake to adopt measures to forestall and, as appropriate, eliminate pollution of the maritime area from land-based sources by radioactive substances referred to in Part II of Annex A of the present Convention.

2. Without prejudice to their obligations under other treaties and conventions, in implementing this undertaking the Contracting Parties shall:

(a) take full account of the recommendations of the appropriate international organizations and agencies;

(b) take account of the monitoring procedures recommended by these international organizations and agencies;

(c) coordinate their monitoring and study of radioactive substances in accordance with Articles 10 and 11 of the present Convention."

"ANNEX A

The allocation of substances to Parts I, II and III below takes account of the following criteria:

(a) persistence;

(b) toxicity or other noxious properties;

(c) tendency to bio-accumulation.

These criteria are not necessarily of equal importance for a particular substance or group of substances, and other factors, such as the location and quantities of the discharge, may need to be considered."

"Part III

The following substances are included in this Part because, although they display characteristics similar to those of substances listed in Part I and should be subject to stringent controls with the aim of preventing and, as appropriate, eliminating the pollution which they cause, they are already the subject of research recommendations and, in some cases, measures under the auspices of several international organizations and institutions; those substances are subject to the provisions of Article 5:

- Radioactive substances, including wastes."

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[1] This Convention is reproduced in the following document: United Nations Environment Programme (1976) Compendium of principal international instruments relevant to the draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, Geneva (unpublished document UNEP/IG.6/INF.3). It also appears in the following source: Johnson, B. (1976) International Environmental Law, Stockholm, LiberFörlag, pp. 139-149.