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Meeting of Experts on Pollutants
from Land-Based Sources
Geneva, 19 - 24 September 1977

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polluants d'origine tellurique
Genève, 19 - 24 septembre 1977

Report of WHO/UNEP Workshop on Coastal Water
Pollution Control, Athens, 27 June - 1 July 1977

The attached report is distributed to participants for their
information.

Rapport de la Conférence-atelier sur la lutte
contre la pollution des eaux littorales, Athènes,
27 juin - 1 juillet 1977

Le présent rapport est distribué aux participants pour
information.

**Coordinated Mediterranean Pollution Monitoring and
Research Programme**

COASTAL WATER POLLUTION CONTROL



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WORLD HEALTH ORGANIZATION
Regional Office for Europe
Copenhagen, 1977

COASTAL WATER POLLUTION CONTROL

Report of a Workshop
jointly convened by WHO and UNEP

Athens, 27 June – 1 July 1977



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Regional Office for Europe
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PREFACE

The UNEP-sponsored International Workshop on Marine Pollution in the Mediterranean, convened in Monaco (9-17 September 1974) by the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the General Fisheries Council for the Mediterranean (GFCM) of the Food and Agriculture Organization of the United Nations (FAO) and the International Commission for the Scientific Exploration of the Mediterranean (ICSEM), defined the pollution of coastal waters as the main environmental problem of the Mediterranean Sea. This pollution was attributed to the general lack of adequate systems for the treatment and disposal of domestic and industrial waste, to the input of pesticides and petroleum hydrocarbons, and to the presence of pathogenic microorganisms.

Based on the recommendations of the Monaco Workshop, the Intergovernmental Meeting on the Protection of the Mediterranean (Barcelona, 28 January - 4 February 1975) approved a Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL) as part of a wider Mediterranean Action Plan.

The MED POL programme consists of seven pilot projects, one of them the WHO/UNEP pilot project on Coastal Water Quality Control (MED VII).

The operational document outlining the framework of MED VII was developed at the WHO/UNEP Expert Consultation in Geneva (15-19 December 1975) taking into account the recommendations of the Monaco Workshop, of the Workshop on Coastal Pollution and other Environmental Health Problems in the Mediterranean (Copenhagen, 16-19 December 1974) and the decisions of the Barcelona Intergovernmental Meeting.

According to the operational document, the overall objective of MED VII is to produce statistically significant data, scientific information and technical principles which are required for the assessment of the present level of coastal pollution as it concerns human health and which are indispensable for the rational design and efficient implementation of national programmes for the control of coastal pollution from land-based sources of the Mediterranean area.

The implementation of MED VII is closely coordinated with the implementation of the other MED POL pilot projects. Data obtained through MED POL will be used to produce an overall assessment of the pollution of the Mediterranean Sea and to formulate recommendations to the governments of the Mediterranean States in respect of desirable and possible management decisions which may decrease or eliminate the extent and present level of pollution in the Mediterranean.

Among the activities proposed in the operational document was a workshop on coastal water pollution control. The workshop was held in Athens from 27 June to 1 July 1977. This report contains the main deliberations, conclusions and recommendations of the workshop.

It is expected that the recommendations contained in this report will attract the interest and support of the responsible authorities of the countries bordering the Mediterranean and that appropriate action will be initiated and implemented.

I. Introduction

The serious and increasingly dangerous situation arising from water pollution in the Mediterranean Sea led to the organization by the United Nations Environment Programme (UNEP) of an inter-governmental meeting of Mediterranean States which was held in Barcelona from 28 January to 4 February 1975

One of the outcomes of the above meeting was the UNEP Co-ordinated Mediterranean Pollution Monitoring and Research Programme; this consists of seven pilot projects, one of which is the joint WHO/UNEP Coordinated Pilot Project on Coastal Water Quality Control in the Mediterranean.

The Workshop on Coastal Water Pollution Control, Athens, 27 June to 1 July 1977, was part of this project and was a direct follow-up to one of the objectives of the programme, namely: "to review methods for the assessment of coastal pollution and to recommend principles for the control of pollution from land-based sources".

The Workshop was an interregional activity involving 18 Mediterranean countries. It examined the methodology for coastal marine pollution control planning and outlined a plan of action for the development of a model code of practice. The Workshop also reviewed the results of related WHO/UNEP-sponsored activities.

The Workshop was organized by WHO/UNEP in cooperation with the Government of Greece and with the assistance of staff of the UNDP/WHO programme "Environmental Pollution Control in the Metropolitan Area of Athens". Dr A. Gilad, Project Manager, acted as Secretary to the meeting. (For list of participants see Annex V.)

Mr J. Kefaloyiannis, Under-Secretary of the Department of Social Services, welcomed the delegates on behalf of the Greek Government. He spoke of the importance Greece attached to preserving the quality of its coastal waters and referred to the fruitful collaboration between his Government, WHO and UNDP. He stressed that Greece was willing to share its experience in the pollution control field with its partners in this international endeavour.

Mr H. Kamberg, Resident Representative of the UNDP in Greece, spoke of the importance of the Mediterranean, not only to those living in the riparian countries but also to people throughout the world. On behalf of UNEP he also welcomed the convening of the Workshop, at which representatives of so many countries were engaged in a joint effort to preserve a great natural heritage.

Mr J.I. Waddington, Chief, Promotion of Environmental Health, WHO Regional Office for Europe, said that considerable progress had already been made under the MED VII and MED X projects and the time had now come to proceed from monitoring to control. Control would involve the expenditure of huge sums of money and it was necessary to ensure that the money would be spent wisely and to good effect. It was hoped that the Workshop would produce recommendations which would result in the preparation of a model code of practice for coastal pollution control in the Mediterranean. He also referred to other aspects of the problem, including manpower and training, the possibilities of water reclamation, and the preparation of environmental impact assessments.

He pointed out the importance of a high standard of food hygiene which, by decreasing the incidence of pathogens in the population and therefore in the sewage, reduced the public health hazards in coastal waters. Finally, he thanked the Greek Government for its valuable assistance in arranging the meeting.

Dr M. Violaki-Paraskeva, Director-General of Public Health of the Ministry of Social Services of Greece, accepted the unanimous invitation of the meeting to act as Chairman, and Dr J. Naggear, of the National Council of Scientific Research of Lebanon, similarly agreed to act as Vice-Chairman.

The provisional agenda was adopted without amendment (see Annex I).

The subjects fell into six main groups and papers covering them were discussed first in plenary session and subsequently in smaller group sessions held concurrently under the chairmanship of the five rapporteurs. The discussion papers and authors are listed in Annex II. Country position papers submitted by some of the participants also contributed to the discussion; these are listed in Annex III.

II. Co-ordination of national coastal water pollution programmes

The following papers "Coastal Water Quality Control Programme in the Mediterranean", (Report of a WHO/UNEP Expert Consultation, Geneva, December 1975) and "Proposed Technical Annexes to a Draft Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-based Sources" (Athens, February 1977) were presented and activities of the UNEP Mediterranean Action Plan pertinent to coastal water quality control described by Dr R. Helmer, of WHO Headquarters. The complementary role of the plan's components relating to environmental legislation, assessment and management was demonstrated by the different projects dealing with pollutants from land-based sources in the Mediterranean.

The proposed Technical Annexes to the Draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources were introduced and the relevant principles of the Draft Protocol indicated. The discussions in plenary and working group sessions resulted in a review of these Technical Annexes, taking into account the comments received from various governments and interested organizations.

The proposed changes will be included in a revised version of the above Technical Annexes for submission to the interested Governments for finalization. The main modifications concerned the inclusion in a "black" and a "grey" list of hazardous and otherwise harmful pollutants requiring strict measures for their elimination and discharge limitation respectively. Factors to be considered in the establishment of criteria governing the control of waste discharges were regarded as a substantial part of the Technical Annexes and a list of major elements in this connexion was established. Also, the need for immediate control measures in respect of all waste discharges from newly established installations was recognized and the task of drafting a comprehensive definition of such installations was entrusted to the WHO secretariat.

Technical guidelines for waste treatment and disposal were, however, considered inappropriate for inclusion in a protocol. Instead, the provision of such guidance in the form of the proposed model code of practice was regarded as an essential support to the implementation of the protocol.

Annexes I, II, and III of the protocol would be retained, subject to the agreed modifications, and Annex IV would be replaced by a new annex dealing with the legal definition of new installations. The existing Annex V would also be removed, its place being taken by the proposed model code of practice.

III. Model Code of Practice

1. Introduction

A paper on Model Code of Practice for the Disposal of Liquid Wastes into the Mediterranean; Introductory Remarks was prepared by Mr D.H.A. Price (Rapporteur). The paper suggested that the purpose of the code was to provide guidance, based upon multinational experience, on the methods of remedying unsatisfactory coastal water conditions and safeguarding marine environments that were of acceptable quality. It would also assist in obtaining uniformity of approach and equality of effort in areas affected by discharges from more than one country. It would encourage the optimal use of resources and maximize the absorptive capacity of the environment. The code of practice should not be regarded as mandatory but as purely advisory.

The paper listed the different stages necessary for introducing and establishing an effective system of pollution control, and drew attention to the various choices available. It was suggested that the code of practice should be drafted on the following lines.

(1) Information

- (a) Chemical, biological and physical conditions of receiving waters
- (b) Inventory of discharges
- (c) Data storage
- (d) Present and future water use and relative importance of criteria regarding receiving waters.

- (2) Determination of ambient water requirements and standards
Formulation of effluent standards to meet ambient standards
- (3) Master plan leading to the construction of specific facilities to meet effluent standards
 - (a) Planning: present and future populations, water supply, industrial development, surface water runoff, etc.
 - (b) Sewerage system:
 - Treatment: choice of processes
 - Sea outfall: selection of site
 - Water reclamation
 - Sludge utilization
 - (c) Economics: optimum solution
 - (d) Programming
- (4) Environmental impact assessment
- (5) Industrial wastes
 - (a) Source control
 - (b) Effluent control
 - (c) Charging systems.

The participants of the Workshop agreed with the contents of the code proposed in the paper but considered that the scope should be expanded. The suggested contents of the different sections of a code of practice were discussed in detail. An outline of a model code of practice based on the discussions is attached as Annex IV.

The Workshop stressed the need for careful phasing of sewage collection treatment and disposal facilities, the need to provide for future expansion and the desirability of considering possible low-cost interim measures. It believed that full attention should be given to the problem of industrial wastes. Consideration should be given to the possibility of reducing or eliminating discharges from both new and existing factories by internal measures such as process modification or water recycling.

The possibility of treating all or part of an industrial waste at municipal sewage works should always be considered since it might often present technical and economic advantages. Any acceptance of industrial waste should, of course, be subject to strict regulations for source control, particularly in respect of toxic and harmful substances.

2. Information System

Information Systems for the Control of Coastal Water Quality

A paper on Information Systems for the Control of Coastal Water Quality was prepared by Mr J. Lys (Rapporteur). The paper dealt with the information needed to determine the quality and characteristics of coastal waters as the first stage in the establishment of a complete pollution control system. It listed the relevant physicochemical parameters, the organic and mineral micropollutants, and the biological and geological characteristics. It stressed the need to restrict the collection of data to that required for decision-making according to the proposed or existing uses of the water.

The Workshop decided to expand the scope of the subject. In order to evaluate risks resulting from waste disposal into the sea and to adopt the necessary prevention and control measures, it was recommended that all information that might play an important part in the development of waste disposal projects and programmes should be included e.g.:

- (1) topographical and hydrological information, including climatological data and land development plans and programmes for the coastal area;
- (2) demographic and social information;
- (3) economic and technological information on industrial and farming activities;
- (4) information on financing problems and institutional structures, both national and international;
- (5) information on all maritime and nautical activities in the sea zone under consideration;
- (6) information on the receiving environment: hydrodynamics, ecology, hydrochemistry, and water quality parameters;
- (7) information on direct and indirect disposal in the sea zone under consideration and preventive and control measures in force.

There should be flexibility in the collection and utilization of such data, which would be obtained from the competent national organizations. Local authorities and industrialists would be requested to keep up to date the information for which they were responsible and to supply it as the need arose.

3. Design Criteria

A paper on Design criteria for liquid waste treatment and disposal systems was prepared by Dr F.M. El-Sharkawi (Rapporteur). The paper indicated the need to adapt to local circumstances when preparing criteria. The coastal zone should be defined and its beneficial uses established. The paper described a wide range of pollutants which might occur in coastal waters and considered them in terms of acceptable concentrations according to the use of the water. It examined the various means of disposal which were available, e.g. direct disposal by pipeline with or without treatment, and disposal to land, and the criteria for determining the appropriate effluent quality and the effect of various local factors upon the determination.

The participants expressed the view that the criteria should be expressed in descriptive terms only and that the numerical values should be reviewed later by an expert group.

The Workshop recommended that standards known to be appropriate to Mediterranean conditions should be used in preference to those developed for other seas and different marine conditions. Under Mediterranean conditions it was always preferable to treat sewage to a condition in which it could be used for irrigation or other purposes. The participants also commended the agricultural use of sludge which, if deposited at sea in unfavourable conditions, could harm the ecosystem.

The use of simple treatment methods with a minimum of mechanical devices was recommended, as was the wider use of oxidation ponds. The installation of pilot plants to develop design criteria for local circumstances was advocated. The importance of proper operation and maintenance and of training sewage plant operators was also stressed.

4. Design of collection, treatment and disposal systems

Three papers on Recommendations for the design of collection, treatment and disposal systems (by Mr A. Velderman (Rapporteur)), Design of liquid waste collection, treatment and disposal systems (by Mr A.J. Vogel), and Position paper on Master planning for the design of systems for the collection, treatment and disposal of liquid wastes (by Mr S.D. Myers) were prepared.

The three papers covered the subject from somewhat different but complementary viewpoints. They dealt with the sequence of master plans, which were long-term and based on comprehensive studies; feasibility studies, which examined possible solutions; preliminary engineering studies, which investigated the most probable solution in some detail, and lastly, the final engineering design for the constructional work. Experience had demonstrated that the employment of a logical, systematic approach led to orderly and smooth progress in the work and a reduction in the customary delays.

The Workshop proposed that the following main recommendations to governments be included in the code of practice:

1. Implementation of sewerage sector studies at the national level, consisting of a comprehensive review of the organizations responsible for a given sector of the current state of development of that sector, and of relevant problems and major policy options. Sector studies are primarily for the benefit of decision-makers at the national and local level and a full sector study, after analysis of the necessary sector information, will:

- (a) identify in physical and financial terms the principal problems and constraints relating to the sector;
- (b) analyse existing goals or propose alternative goals toward which a national plan for the sector can be directed;
- (c) recommend the establishment or modification of organizations, policies and practices required to achieve the goals, after consideration of whatever practical alternatives may be available, and after consideration and discussion of the views of the government concerned.

2. For specific priority projects identified and agreed within the framework of sewerage sector development plans, specific terms of reference should be formulated to carry out the necessary long-, medium- and short-term planning and design by means of master plans, feasibility and preliminary engineering studies, and the final engineering design.

Master plans and feasibility studies for liquid waste collection, treatment and disposal are long-range plans comprising field investigations, surveys and interrelated technical, socioeconomic, financial, legal, institutional and organizational studies which broadly establish the basis of a multistage programme for the future development of such facilities.

The Workshop recommended the orderly implementation of a sequential planning process leading to the development of phased programmes for the construction of liquid waste collection, treatment and disposal facilities. It also stressed that due attention should be given to the need for governments to follow up the recommendations made in master plans on institutional aspects and on the operation and maintenance of the constructed facilities.

5. Environmental impact assessment

A paper on Environmental impact assessment system for coastal water pollution control was prepared by Dr U. Marinov (Rapporteur). The paper described environmental impact assessment as a process whereby full and systematic consideration was given to environmental values and to economic, technical and other factors in decision-making processes. The process included identifying, predicting, interpreting and communicating information regarding the likely effects of an action on the health and well-being of man and on the ecosystems on which he depended. The paper then described the method of preparation of an environmental impact statement (EIS) and its function in assessing the full consequences of any proposed action.

The following points arose from the discussion:

1. The use of EIS for introducing environmental considerations into the decision-making processes was approved by the meeting.
2. The assessment should start at the earliest possible stage, i.e. at the conception phase, to avoid unnecessary conflicts with development.
3. Cost/benefit analysis should be introduced as far as possible in qualitative as well as quantitative terms.
4. EIS should be part of integrated land-use (physical) planning and of environmental control programmes.
5. The use of EIS should not cause delays in the decision-making process. The evaluation of the EIS should be made as soon as possible after it is submitted.

6. The EIS should be introduced in each country by a specific law or regulation.

7. The idea of using national or multinational consultative organizations for the evaluation of EIS was considered. Such organizations could give valuable service in countries where local expertise was lacking.

6. Administrative, financial and allied aspects

It was agreed that the code should include matters concerning the basic organizational, financial and legal framework essential for the development and establishment of any system of pollution control. An organization, possibly an agency of either central or local government, responsible for the management of liquid wastes, and with adequate and appropriately qualified manpower, would be required. Because there was a minimum critical size, grouping might be necessary. Monitoring of coastal waters and effluents could be carried out by the same organization or by a separate independent body.

The organization should cooperate closely with the planning authorities regarding all new developments likely to affect the quality of coastal waters. It should have the powers necessary to obtain information and to enforce control measures.

There should be a sound and assured financial basis for the system to enable it to meet the costs of the preliminary work and capital expenditure, and the regular and continuing costs of operation, maintenance and monitoring. Rural areas would need central governmental assistance to meet, in part at least, both capital and continuing expenditure. The participants stressed the need, in all schemes, to budget for full and adequate operation and maintenance. That factor was often not taken into consideration and, in consequence, much of the value of substantial capital expenditure might be lost.

7. Manpower and training

A paper on Manpower development: Introductory Remarks was prepared by Mr D.H.A. Price (Rapporteur). The paper indicated the disciplines required for the different sections of a water pollution control system, namely:

- (1) initial survey and information collection,
- (2) planning, design and construction,
- (3) operation and management,
- (4) water quality and effluent monitoring.

The Workshop stressed the need for a multidisciplinary approach and suggested that staff should be capable of being transferred between sections. It was recommended that the management staff should be present during the construction of treatment plants.

In communities where the sewage flow originated from fewer than 50 000 people it was advantageous to share manpower at all levels. For smaller communities, where skilled operators could not be readily found, it was advisable to install simple disposal and treatment systems, even if the initial capital costs were higher. It was necessary to balance the cost of labour-saving machinery against local labour costs. The optimum solutions would vary considerably between and within countries.

In assessing training requirements, the first step should be to prepare inventories of training facilities available at all levels and to estimate existing and long-term manpower needs.

A major difficulty in providing international training facilities was that of language. However, the Greek Government was prepared to provide training facilities, in English, in Athens and there were also courses available in Alexandria, where, a 6-week course for engineers and chemists was conducted in English, as well as a 2-3 month course in Arabic for operators. The continuation of those courses depended upon assistance from international funds, and the participants of the Workshop believed such support was fully justified.

It was suggested that an annex might be attached to the model code of practice listing the courses available at different levels within the Mediterranean region.

The participants stressed the value of in-service training.

8. General

The papers presented at the meeting gave rise to discussions not only on their immediate subjects but also on some of their more important implications and consequences. A feature of all the discussions was the practical nature of many of the comments based upon both Mediterranean and general experience. It became clear that criteria and practices developed elsewhere were not always directly applicable to Mediterranean conditions. Moreover, the climate and geography of some areas of the Mediterranean region offered special advantages regarding the use of low-cost, low-energy methods of treatment and disposal.

The workshop suggested that the proposed code of practice should address itself to national planners and decision-makers so that they should be fully aware of their role in the planning process and their responsibility to make the necessary decisions required in timely fashion. The code would also be intended for national and local authorities responsible for the actual planning, design, construction, operation and maintenance of the various facilities for the collection, treatment and disposal of wastewater.

There was a consensus on the value of a code of practice, such as had been discussed, to all the countries represented at the Workshop.

IV. Conclusions and recommendations

1. The proposed Technical Annexes I, II and III to the Draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources are, subject to the agreed modifications, endorsed for submission to the governments for review and further discussion.
2. The criteria and guidelines enumerated in the proposed Technical Annex V to the Draft Protocol form a valuable basis for the formulation of a Model Code of Practice for the Disposal of Liquid Wastes into the Mediterranean, which will provide essential guidelines for the implementation of the Protocol.
3. The total expenditure necessary for the construction and operation of facilities for the collection, treatment and disposal of liquid wastes in the Mediterranean region is likely to be not less than the equivalent of US\$ 5 000 000 000 over the next 10-20 years.
4. There is ample evidence that some of the investment already made has been ineffectively utilized due to inappropriate design and construction and failure to provide adequate operational and maintenance facilities and manpower.
5. There is thus an urgent need to provide governments with information about existing experience and proven methods to assist in rational decision-making which will ensure the optimal use of resources without prejudice to socioeconomic development.
6. Coastal pollution problems in the Mediterranean countries have certain common factors which encourage the development of a shared philosophy and approach in relation to objectives and ways and means of achieving them.
7. A common effort should be made to ensure harmonization of effort through the development of a model code of practice for the disposal of liquid wastes into the Mediterranean.
8. Considering the difficulty and complexity of the task of developing a model code of practice and in view of the urgency of this task due to the imminent commitment of vast sums of money, a draft model code of practice should be developed as soon as possible, and should be refined, augmented and amended as additional information and experience become available.

9. The draft model code of practice should utilize and be based on the results of completed and current UNEP/WHO Mediterranean activities and other relevant studies.
10. In the first instance, the draft code of practice should deal with the following items:
 - (a) an information system for coastal pollution control;
 - (b) criteria for the design of collection, treatment and disposal systems for wastewaters, including reuse;
 - (c) design of collection, treatment and disposal systems (master plans, feasibility studies and preliminary designs, etc.);
 - (d) environmental impact assessment;
 - (e) administrative, financial and allied aspects.
11. The code of practice should be developed within the framework of the Mediterranean Action Plan in the following stages:
 - (a) appointment of experts or groups of experts to prepare drafts of the various chapters;
 - (b) review of individual drafts by working groups;
 - (c) examination and consideration of drafts by all the countries concerned, followed by an overall review of the final draft.
12. International comparative studies of selected existing treatment and sea outfall systems should be carried out in the Mediterranean region over a period of at least 3 years as a matter of urgency. Such studies should be coordinated by UNEP and should receive strong support from participating countries.
13. In selecting the form of disposal most suitable for local conditions, full consideration should be given to the possible utilization of wastewater, e.g. application to agricultural land, augmentation of water resources and enrichment of sea areas deficient in nutrients.
14. Action to reduce the public health hazards of polluted coastal waters should not be confined to engineering works but should include, inter alia, such measures as the reduction of pathogens in sewage by improving food hygiene. This aspect of coastal pollution control warrants further study.
15. The availability of adequately trained manpower for all aspects of coastal pollution control is of great importance. The development of the required level of manpower will involve:
 - (a) an inventory of existing manpower in the various categories and a forecast of future needs;
 - (b) an inventory of existing training facilities and an evaluation of their adequacy to satisfy future needs;
 - (c) the development of national and international training programmes in the Mediterranean region.
16. The Greek Government's offer to establish an international Mediterranean centre for marine pollution control was noted with interest by the participants. This and similar initiatives by other Mediterranean countries should be encouraged. The dissemination of information and the training of personnel should be priority tasks of such centres.

AGENDA

1. Opening session

1.1 Addresses of welcome:

- (a) Government of Greece
- (b) United Nations Environment Programme
- (c) World Health Organization

1.2 Election of Chairman and Vice-Chairman

1.3 Adoption of agenda

2. Coordination of national coastal water pollution programmes (Rapporteur: Dr R. Helmer)

2.1 Principles of a protocol for the protection of the Mediterranean Sea against pollution from land-based sources

2.2 Technical annexes:

- (a) Annex I: Harmful substances - discharge to be prohibited and effectively prevented
- (b) Annex II: Harmful substances - limited discharge with special care and under control
- (c) Annex III: Criteria for control of waste discharges containing substances listed in Annex II
- (d) Annex IV: Types of newly established installations whose discharges should undergo treatment
- (e) Annex V: Technical guidelines for treatment and disposal of discharges from establishments listed in Annex IV.

3. Model Code of Practice for the Disposal of Liquid Wastes into the Mediterranean (Rapporteur: Mr D.H.A. Price)

3.1 Feasibility, form and method of development of Model Code

3.2 Contents of Model Code

3.3 Manpower development and training

3.4 Other related matters

4. Information systems for coastal water quality control (Rapporteur: Mr J. Lys)

4.1 Survey

- (a) Quantity and composition of domestic wastes
- (b) Quantity and composition of industrial wastes
- (c) Parameters:
 - (i) physical: currents, tides, stratification
 - (ii) chemical: nutrients, persistent substances
 - (iii) biological: productivity, species distribution
 - (iv) hygienic: dispersion and survival of pathogens and indicator bacteria

- 4.2 Quantity and quality of required data
- 4.3 Information delivery system
- 5. Design criteria for liquid wastes treatment and disposal systems
(Rapporteur: Dr F. El-Sharkawi)
 - 5.1 Water quality criteria for coastal marine environment
 - (a) public health
 - (b) aesthetics
 - (c) other water quality criteria
 - 5.2 Effluent criteria
 - (a) biodegradable effluents
 - (b) non-biodegradable, persistent and toxic substances
 - (c) rain and surface drainage, including agricultural run-off
- 6. Environmental impact assessment system (Rapporteur: Dr U. Marinov)
 - 6.1 Types of actions likely to have a significant impact on coastal water quality
 - 6.2 Responsibility for preparing environmental impact statements (EIS)
 - 6.3 Recommended contents of EIS
 - 6.4 Recommended review and approval process
 - 6.5 International exchange of EIS information
- 7. Design of collection, treatment and disposal systems (Rapporteur: Mr A. Velderman)
 - 7.1 Master plans for sewerage
 - 7.2 Preliminary designs for treatment plants and disposal facilities
 - 7.3 Feasibility studies
 - 7.4 Administrative and financial aspects
- 8. Conclusions and recommendations
 - (a) Technical annexes
 - (b) Model Code of Practice for the Disposal of Liquid Wastes into the Mediterranean
 - (c) Other

LIST OF DISCUSSION PAPERS

Proposed Technical Annexes to a Draft Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources.

Model Code of Practice for the Disposal of Liquid Wastes into the Mediterranean: introductory remarks

Mr D.H.A. Price

Manpower development: introductory remarks

Mr D.H.A. Price

Information systems for control of coastal water quality

Mr J. Lys

Design criteria for liquid waste treatment and disposal systems

Dr F.M. El-Sharkawi

Environmental impact assessment system for coastal water pollution control

Dr U. Marinov

Recommendations for the design of collection, treatment and disposal systems

Mr A. Velderman

Design of liquid waste collection, treatment and disposal systems

Mr A.J. Vogel

Position paper on master planning for the design of systems for the collection, treatment and disposal of liquid wastes

Mr S.D. Myers

COUNTRY POSITION PAPERS

Country position papers were submitted by the following:

Mr J.C. Degaetano	(Malta)
Mr J. Jacovides	(Cyprus)
Dr L. Jeftic	(Yugoslavia)
Dr S.A. Khawaja	(Libya)
Mr G. Markantonatos and Mrs E. Valiantza	(Greece)
Mr J.P. Mercier	(France)
Dr R. Mujeriego	(Spain)
Dr J. Naggear	(Lebanon)
Mr P. Nounou	(France)

SUGGESTED OUTLINE OF CONTENTS OF A CODE OF PRACTICE
FOR COASTAL POLLUTION CONTROL IN THE MEDITERRANEAN

This outline is intended as a guide to the preparation of the different sections of the code, one of its purposes being to minimize duplication or overlapping between the sections. It is neither detailed nor exhaustive.

1. Introduction

This section should cover the scope, purpose and application of the code.

2. Information systems

The information required may be divided into two sections: firstly, that leading to the specification of the appropriate water quality and the corresponding constraints upon the sources of pollution, and secondly, that needed to select, design and execute an engineering solution.

(a) Investigatory

(1) Present conditions:

- (a) Water quality: chemical, biological, physical
- (b) Character of the sediment
- (c) Pollutant content of the biota
- (d) Hydrology of the coastal zone
- (e) Geology of the coastal zone

(2) Water uses, and an assessment of their importance:

- (a) Recreation
- (b) Amenity and aesthetics
- (c) Commercial
- (d) Industrial

(3) Pollution sources (quantity, quality and location):

- (a) Domestic sewage
- (b) Industrial wastes
- (c) Agricultural wastes and drainage
- (d) Surface water runoff
- (e) Rainfall

(b) Engineering design

(1) Existing facilities and conditions: collection, treatment and disposal; flows and characteristics of sewage and other liquid wastes.

(2) Physical: topography, climate, geology, hydrology

(3) Development: long-term plans for land use, population growth, industrial development, water resource planning

(4) Administrative, etc.: organization, administrative boundaries, financial arrangements, manpower, legal matters.

Most of the above information will be required for compiling the EIS and additional data may be needed in certain circumstances.

This section should also deal with data processing, storage, retrieval, interpretation and information delivery. It should emphasize that compatibility of information systems within and between the countries is desirable.

3. Design criteria

(a) Criteria for determining ambient standards (i.e. standards relating to a defined zone of coastal water) for the protection of public health and the marine environment according to its present and future uses. The criteria would take into account the extent of primary and secondary contact involved in the uses. They would cover the following general characteristics:

- (1) chemical,
- (2) biological, including microbiology,
- (3) physical

Criteria for the individual items would be given in either numerical or descriptive terms, or in both.

(b) Criteria for effluent standards required to meet the ambient standards according to:

- (1) the point of discharge of the effluent,
- (2) the rate of dispersion of the effluent,
- (3) the behaviour of the effluent, e.g. direction of movement,
- (4) the quality and quantity of the discharge, with particular reference to the ambient standards already determined for the zone.

(c) Effluent characteristics

- (1) Biodegradable substances
 - (a) not toxic
 - (b) harmful or toxic
- (2) Persistent or of low biodegradability
 - (a) not harmful or toxic
 - (b) harmful or toxic
- (3) Settleable matter
- (4) Floatable matter

Standards may include limits for concentration, volume and mass load.

The effluent standards stipulated for any given discharge point would determine the degree of treatment required.

4. Design of collection, treatment and disposal systems

(a) Information required:

- (1) physical, e.g. topography, climate, rainfall, geology, hydrology of coastal zone;
- (2) developmental, e.g. long-term proposals for land use, population growth, industrial development, agricultural trends;
- (3) design, e.g. existing facilities: quantity, quality and flow characteristics of domestic sewage; inventory of industrial wastes; agricultural drainage; surface wastes runoff; unit engineering costs.

(b) Programme formulation

- (c) Preparation of:
 - (1) sector studies,
 - (2) master plans,
 - (3) feasibility studies,
 - (4) preliminary engineering studies,
 - (5) final engineering studies.
- (d) Interrelationship between different sections, e.g. between EIS and engineering design.

5. Environmental impact assessment

The assessment should include any significant consequence of the proposed action upon the environment, however remote. The information needed may therefore be even more comprehensive than that assembled for the other sections.

- (a) Definition and purpose
- (b) Actions which may have an environmental effect
- (c) Contents
 - (1) Prediction of effects
 - (2) Possible means of minimizing effects

The statement may include an appraisal of the impact of individual constituents of effluents.

- (d) Review of proposed action on basis of statement
- (e) Updating of the statement and adaptation to new or modified proposals.

6. Administrative, financial and allied aspects

- (a) Organizational requirements for:
 - (1) establishment of water control system,
 - (2) management of collection, treatment and disposal arrangements,
 - (3) monitoring of coastal water and effluents.
- (b) Financial needs:
 - (1) capital,
 - (2) regular expenditure,
 - (3) revenue collection,
 - a. domestic sewage,
 - b. industrial wastes.
- (c) Powers for:
 - (1) obtaining information,
 - (2) enforcing regulations.

7. Manpower and training

- (a) Manpower
 - (1) Guidelines on manpower requirements for various sections of the organization for the control of coastal water pollution: numbers and educational level based on population served, flow characteristics, type of collection, treatment and disposal.
 - (2) Inventory of national resources
 - (3) Inventory of national requirements.

(b) Training

- (1) Inventory of national facilities
- (2) Training programme to meet manpower requirements based upon national and international facilities.

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