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Meeting of Experts to Evaluate
the Pilot Phase of MED POL and
to Develop a Long-term Monitoring
and Research Programme for the
Mediterranean Action Plan

Geneva, 12-16 January 1981

REPORT OF THE MEETING OF EXPERTS TO EVALUATE THE PILOT PHASE OF MED POL
AND TO DEVELOP A LONG-TERM MONITORING AND RESEARCH PROGRAMME
FOR THE MEDITERRANEAN ACTION PLAN
GENEVA, 12-16 JANUARY 1981



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS



WORLD HEALTH ORGANIZATION



WORLD METEOROLOGICAL ORGANIZATION



INTERNATIONAL ATOMIC ENERGY AGENCY



INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

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INTRODUCTION

1. The Intergovernmental Review Meeting of Mediterranean Coastal States and the First Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its related Protocols (Geneva, 5-10 February 1979) recommended that during the 1979-1980 biennium the results of MED POL - PHASE I should be evaluated and a long-term pollution monitoring and research programme (MED POL - PHASE II) should be formulated (UNEP/IG.14/9, annex V, paras. 1-13).
2. Consequently UNEP, with the collaboration of the organizations that supported MED POL - PHASE I, prepared an evaluation of the pilot phase of MED POL (UNEP/WG.46/3) and a draft proposal for a long-term monitoring programme (UNEP/WG.46/4) to be reviewed and revised by the Meeting of Experts before submission for approval to the Second Meeting of the Contracting Parties (March 1981).
3. The Meeting was convened by UNEP and cosponsored by the Food and Agriculture Organization of the United Nations (FAO), World Health Organization (WHO), World Meteorological Organization (WMO), International Atomic Energy Agency (IAEA), and the Intergovernmental Oceanographic Commission (IOC).

ATTENDANCE

4. Experts from 15 Mediterranean coastal States and the European Economic Community (EEC) participated in the Meeting in their personal capacity.
5. Representatives from one United Nations body (Economic Commission for Europe (ECE)), four specialized agencies (FAO, United Nations Educational, Scientific and Cultural Organization (UNESCO), WHO, WMO), the IAEA, IOC and the International Commission for the Scientific Exploration of the Mediterranean Sea (ICSEM) attended the Meeting. A complete list of participants is contained in annex I to this report.

Agenda item 1 : Opening of the Meeting

6. The Meeting was opened by S. Keckes, Director of the Regional Seas Programme Activity Centre of UNEP, who welcomed the participants on behalf of the Executive Director of UNEP and pointed out the importance of the Mediterranean Action Plan, especially its scientific component (MED POL), which was being used by UNEP as a model in other regional seas areas.

7. A. Manos, Co-ordinator of the Mediterranean Action Plan, made a review of the activities of the Action Plan, stressing the importance of the monitoring and research component, and drawing to the attention of the participants the difficult financial situation caused by delays in the contributions to the Mediterranean Trust Fund pledged by some of the Contracting Parties.

Agenda item 2 : Organization of the Meeting

8. The rules of procedure adopted for meetings and conferences of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its related Protocols (UNEP/IG.14/9, annex VII) were used in the Meeting.
9. The meeting unanimously elected the following officers: L. Saliba as Chairman; V. Pravdic and R. Semroud as Vice-Chairmen; A. Cruzado as Rapporteur.
10. The meeting adopted the agenda contained in annex II to this report. The list of the documents available to the participants in the Meeting is contained in annex III.

Agenda item 3 : Evaluation of the results of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme and related activities (MED POL - PHASE I)

11. S. Keckes briefly introduced the scientific summary report and the administrative report of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL) (UNEP/WG.46/3, part I and part II) covering the period February 1975 - June 1980.
12. Representatives of the United Nations specialized agencies responsible for the technical implementation of individual MED POL projects highlighted the progress achieved and the difficulties encountered during the pilot phase.
13. In summarizing the presentations of the specialized agencies, S. Keckes described MED POL as a successful programme and as the largest and most complex co-operative scientific programme with specific and well-defined aims ever undertaken in the Mediterranean basin. Eighty-three research centres from 15 Mediterranean States and the EEC had been designated to participate in 17 related projects, involving about 200 Mediterranean scientists and technicians and eight specialized agencies of the United Nations system. The preliminary analysis of the scientific results (UNEP/WG.46/3, part I) would be analysed in the light of the results obtained up to the end of 1980 and would be presented as part of the final report on the pilot phase of MED POL (MED POL - PHASE I). The results obtained by the research centres participating in the programme were being prepared as their

individual final reports and as part of the proceedings of the IV and V ICSEM/UNEP Workshops on Marine Pollution in the Mediterranean (Antalya, November 1978 and Cagliari, October 1980). The total cost of this phase was estimated at about US\$ 18.5 million, of which US\$ 4.5 million contributed by UNEP and about US\$ 500,000 by the Mediterranean Trust Fund in cash; about US\$ 1.5 million was being contributed in kind and services by the specialized agencies.

14. Following these statements and on the basis of a draft prepared by a working group the meeting reached the conclusions contained in paragraphs 15 to 36.
15. The Intergovernmental Meeting on the Protection of the Mediterranean held from 28 January to 4 February 1975 approved a Mediterranean Action Plan and gave UNEP a mandate, as sponsor of the operations, to carry out with the co-operation of appropriate organizations and especially the competent international agencies, acting as the executives, a 'co-ordinated programme for research, monitoring, exchange of information, assessment of the state of pollution and of protection measures'.
16. The general objectives of MED POL - PHASE I were:
 - to formulate and carry out a co-ordinated pollution monitoring and research programme taking into account the goals of the Mediterranean Action Plan and the capabilities of the Mediterranean research centres to participate in it;
 - to assist national research centres in developing their capabilities to participate in the programme;
 - to analyse the sources, amounts, levels, pathways, trends and effects of pollutants relevant to the Mediterranean Sea;
 - to provide the scientific/technical information needed by the Governments of the Mediterranean States and the EEC for the negotiation and the implementation of the Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols.
17. During the pilot phase (1975-1980) 17 MED POL related projects, seven of them with priority status, were undertaken. The specific objectives of the seven basic projects (MED POL I - MED POL VII), were as follows:

MED POL I	To determine the distribution of oil and petroleum hydrocarbons in the Mediterranean Sea.
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- MED POL II and III To provide baseline data and to initiate monitoring of selected contaminants in marine organisms in the Mediterranean; to achieve a better co-ordination of ongoing and new studies; to improve the comparability of the results; and to obtain an overall picture of levels of contaminants considered to be important.
- MED POL IV To study the effects of pollutants on marine organisms and their populations.
- MED POL V To carry out research on pollution induced modifications on marine communities in comparison with biocenotic conditions in similar but unpolluted habitats.
- MED POL VI To determine persistent local current patterns as means of evaluating probable transport paths of floating or dissolved pollutants.
- MED POL VII To assess the potential health hazards connected with the coastal waters of the Mediterranean, including promotion of scientific studies on the epidemiological evidence of health effects from coastal pollution and development of relevant technical documentation.

18. Projects MED POL I to VII all contained training and technical assistance (equipment, maintenance, etc.) components.
19. Projects MED POL VIII to MED POL XIII were added to the basic seven to take care of specific requirements needed for the further development of the Mediterranean Action Plan. They are not evaluated here. Nevertheless, most of the lessons learned from MED POL I through MED POL VII also apply to these other projects.
20. The following was achieved during the pilot phase:

- MED POL I Establishment of regular sampling programmes in twelve Member States, for one or more of the components of monitoring (floating oil, floating tarballs, dissolved/dispersed petroleum hydrocarbons, tar on beaches);
- MED POL II and III Consolidated baseline data on levels of heavy metals and chlorinated hydrocarbons in marine organisms in the Mediterranean have now become available. A total of more than 20,000 data has been reported, some of it from areas where data was not previously available. The basis for future monitoring activities has been provided. Through the provision of appropriate instruments, several laboratories are now in a position to perform analyses of major pollutants.

- MED POL IV The results of research performed provided information on the effects of PCBs, oil dispersants, PNA and PAH and thermal discharges on marine organisms, which may contribute to the eventual revision of the annexes to the Dumping and Land-based Sources Protocols.
- MED POL V A number of polluted areas influenced by big rivers, large cities and adjacent industrial conglomerations were investigated. The results identified environmental stresses and effects on phyto and zooplankton communities as well as on soft and hard bottom communities of selected marine areas. They also indicated that massive and combined loads of river-borne and coastal pollution caused considerable modifications of whole ecosystems in certain areas with trends towards a general eutrophication and consequently to ecological disequilibria.
- MED POL VI Regular measurements of coastal currents and associated hydrographic work were promoted and, in some cases combined with collection of related weather data.
- MED POL VII The monitoring aspect covered satisfactorily the surveillance of bathing waters and shellfish. Standard methodology and microbiological parameters were agreed and applied. Studies on the applied microbiological parameters provided useful information on their reliability, comparability, specificity and adequacy. Interim criteria for recreational waters and shellfish were formulated
21. All projects contributed substantially to the improvement of the technical capabilities of participating institutes through training and provision of equipment.
 22. Experience gained from the various individual projects has underlined the importance of agreed methods being followed by all participating research centres, of participating research centres and their governmental authorities providing the adequate back-up to their scientists and technicians, and of reporting of results in standardized format. In the case of monitoring programmes, the necessity of participation in continuous intercalibration exercises is similarly underlined.
 23. Requirements of sampling programmes have not been always foreseen and met by participating research centres, particularly as regards vessel support, equipment maintenance, and data handling. Sampling programmes must cover at least seasonal variations.

24. Selection of monitoring areas by the participating research centres would have required stronger and more effective co-ordination.
25. In research, a more limited number but widely available species should have been selected, and the work should have been concentrated on the most important pollutants. A higher degree of standardization of research methods would have facilitated the comparative evaluation of the results.
26. In monitoring the quality of coastal areas, more emphasis should have been placed on non-bacteriological parameters.
27. The critical analysis and evaluation of the results obtained through MED POL - PHASE I, with regard to both the overall objectives pursued, and the quality of the results obtained, is summarized in the following paragraphs.
28. For five years, scientific experts of 83 laboratories belonging to 15 Mediterranean States and EEC, under the overall co-ordination of UNEP and the specialized agencies entrusted with the management and sponsorship of studies, concerted their efforts in the very specialized field of marine pollution in order to safeguard the Mediterranean and its resources. Despite their widely differing levels of competence and means, all of them have contributed, each according to his field of competence, to the implementation of the MED POL pilot projects.
29. With regard to form, the pilot phase has helped to lay the foundations of a research infrastructure by equipping national laboratories, encouraging them to study their marine environment and enabling them to collect objective information and data on the quality of the Mediterranean environment.
30. On the scientific side, the state of pollution of the Mediterranean has not yet been fully understood. A question remains still open, whether so-called non-polluted, slightly polluted or heavily polluted zones correspond to reality, or is it simply a reflection of the combination of fortuitous circumstances such as the proximity of a research laboratory or the consequence of unco-ordinated and inconsistent choice of the monitored areas.
31. The dual, intergovernmental and interdisciplinary, approach and also the complexity and geographical scale of the studies have led to the inevitable difficulties which are normally associated with pilot phase. The major gaps, especially in the overall general management procedures identified during the pilot phase should serve as a lesson, so that they could be avoided in MED POL - PHASE II.

32. Definition and formulation of the future objectives should reflect the concern of Governments and should be translated into programmes. Recording, systematic evaluation and interpretation of the preliminary results should be performed with a view to the continued development of this programme and to the final synthesis of the results.
33. The not fully satisfactory quality control of data through intercalibration exercises made the assessment of the quality of the results, especially in monitoring operations, very difficult. Therefore, unless efforts to standardize methods are matched in the future by rigorous application of these methods in all laboratories, future intercalibration exercises would be extremely difficult, or even impossible.
34. Comments were made on the actual involvement of some of the designated research institutions, including the regional activity centres for specific pilot projects.
35. With regard to finance, the resources needed for mobilizing, qualifying and equipping laboratories have been added from international sources (UNEP, specialized agencies) through the pilot phase to those which Governments provided for carrying out national programmes. In some countries, the funds provided by the Governments were inadequate for work undertaken under MED POL while in other countries the same work was almost entirely financed from national sources.
36. The views expressed in previous paragraphs do not constitute conclusions, but should serve in the management of the long-term programme. In that context, the meeting considered that it should not list points which could be a source of either self-satisfaction or self-criticism. It wished to draw attention objectively to all the inevitable weaknesses of the complex and thankless tasks of organizing, co-ordinating and implementing the pilot phase, and to identify opportunities and dangers before embarking on the long-term programme, as proposed in annex IV to this report, where modalities, conditions and procedures for its implementation are described.

Agenda item 4. Development of the draft Long-Term Programme
for Pollution Monitoring and Research in the Mediterranean
(MED POL - PHASE II)

37. The draft long-term programme for pollution monitoring and research in the mediterranean (MED POL - PHASE II) was introduced by S. Keckes through the presentation of document UNEP/WG.46/4.

38. The meeting undertook a thorough and detailed analysis of the draft proposal and revised it in the light of the ensuing discussion. The revised proposal for MED POL PHASE- II, as adopted by the meeting, is attached as annex IV to this report.
39. The following areas were identified as essential programme elements required to fulfil the goals set by the Convention and its Protocols:
 - (i) monitoring and those supporting activities essential for its implementation, including development of methods (paragraphs 12-29, 35-39, 42(a), 42(b), 43-53 of annex IV to this report);
 - (ii) studies required to develop the scientific rationale for standards and criteria (paragraphs 35-39, 42(c), 42(d), 42(e), 43-53 of annex IV to this report);
 - (iii) research and study essential to the understanding of pollution processes and their control (paragraphs 35-39, 42(f), 42(g), 42(h), 42(i), 42(j), 42(k), 42(l), 43-45 of annex IV to this report).
40. The meeting recommended, on the basis of past experience, that a minimum budget of U.S. \$1,200,000 be allocated annually for these activities in the triennium 1981/83. The meeting also recommended that two-thirds of this should be allocated to activities (i) and (ii) and one-third to activity (iii) as reflected paragraph 39.
41. The meeting requested the secretariat to propose, in co-operation with the relevant specialized agencies, a timetable and budget for the implementation of individual MED POL - PHASE II activities for the triennium 1981-1983 and to submit it for consideration to the Meeting of Financial and Programming Experts of the Mediterranean States (Geneva, 26 - 30 January 1981). The basis for this proposal should be:
 - (i) the revised proposal for MED POL - PHASE II as shown in annex IV of this report and,
 - (ii) the priorities assigned to various activities as reflected in paragraph 40.
42. In making such a proposal the secretariat should keep the budget within the sum of U.S. \$ 3.6 million for the 1981 - 1983 triennium, i.e. at the average level of U.S. \$ 1.2 million per year.
43. The meeting neither considered nor discussed document UNEP/WG.46/5 and UNEP/WG.46/5 Add.1.

44. The meeting considered document UNEP/WG.46/7, found it a useful step towards the development of environmental quality criteria and recommended that the document be brought to the attention of the Governments and EEC.

45. Document UNEP/WG.46/8 was not considered by the meeting.

Agenda item 5. Other matters

46. No other matters were raised by the participants nor by the secretariat.

Agenda item 6. Adoption of the report

47. The English and French versions of this report and its annexes were adopted unanimously by the meeting, except paragraph 17 of annex IV, on which complete agreement could not be reached as to the inclusion of 'petroleum hydrocarbons in water and in sediments' as a priority pollutant to be monitored in coastal waters.

Agenda item 7. Closure of the meeting

48. The meeting was closed by the Chairman on 16 February at 19.15 hours.

ANNEX I

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ANNEX II

AGENDA

1. Opening of the meeting
2. Organization of the meeting
3. Evaluation of the results of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme and related activities (MED POL - PHASE I)
4. Development of the draft Long-Term Programme for Pollution Monitoring and Research in the Mediterranean (MED POL - PHASE II)
5. Other matters
6. Adoption of the report
7. Closure of the meeting

ANNEX III

LIST OF DOCUMENTS

UNEP/WG.46/1	Provisional Agenda
UNEP/WG.46/2	Annotated Provisional Agenda
UNEP/WG.46/3 - Part I	Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL - PHASE I). Summary Scientific Report
UNEP/WG.46/3 - Part II	Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL - PHASE I). Administrative Report
UNEP/WG.46/4	Draft Long-Term Programme for Pollution Monitoring and Research in the Mediterranean (MED POL - PHASE II)
UNEP/WG.46/5 & Add.1	Draft Long-Term Programme for Pollution Monitoring and Research in the Mediterranean (MED POL - PHASE II): Detailed Programme Description
UNEP/WG.46/6	Draft Reference Methods for Pollution Studies in the Mediterranean Sea (not issued)
UNEP/WG.46/7	Draft Environmental Quality Criteria
UNEP/WG.46/8	Data processing for MED POL - PHASE II
UNEP/WG.46/Inf.1/Rev.1	List of documents
UNEP/WG.46/Inf.2	List of participants
UNEP/WG.46/Inf.3	The Mediterranean Action Plan: A short review (not issued)
UNEP/WG.46/Inf.4	Convention for the Protection of the Mediterranean Sea against Pollution and its related (3) Protocols

- UNEP/WG.46/Inf.5 Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL - PHASE I): Programme description (not issued)
- UNEP/WG.46/Inf.6 Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL - PHASE I): Scientific Reports of Participants (not issued)
- UNEP/WG.46/Inf.7 Intercalibration of Analytical Methods on Marine Environmental Samples
- UNEP/WG.46/Inf.8 Greek Co-ordinated Research Programme on Sea Water Pollution
- UNEP/WG.46/Inf.9 Programme of Long-Term International Co-operative Action to Study Marine Pollution in the Mediterranean and Oceanographic Campaigns Planned for 1981

ANNEX IV

BACKGROUND

1. The pilot phase of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL - PHASE I) was initiated in 1974 and formally approved by the Intergovernmental Meeting on the Protection of the Mediterranean (Barcelona, 28 January - 4 February 1975) as the scientific/technical component of the Mediterranean Action Plan.
2. Initially it consisted of seven pilot projects (MED POL I - VII), which were later expanded by an additional six pilot projects (MED POL VIII - XIII), some of which remain in a conceptual stage only. It was based on the work of 84 national research centres designated by 15 Mediterranean States as participants in co-operative networks and on the input of 8 United Nations organizations (ECE, UNIDO, FAO, UNESCO, IOC of UNESCO, WHO, WMO, IAEA), IUCN and ICSEM. The overall co-ordination and guidance for MED POL - PHASE I was provided by UNEP, acting as the secretariat of the Mediterranean Action Plan.
3. The general objectives of the MED POL - PHASE I, evolved through a series of expert and intergovernmental meetings, were
 - to formulate and carry out a co-ordinated pollution monitoring and research programme taking into account the goals of the Mediterranean Action Plan and the capabilities of the Mediterranean research centres to participate in it,
 - to assist national research centres in developing their capabilities to participate in the programme,
 - to analyse the sources, amounts, levels, pathways, trends and effects of pollutants relevant to the Mediterranean Sea,
 - to provide the scientific/technical information needed by the Governments of the Mediterranean States and the EEC for the negotiation and implementation of the Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols;
 - to build up consistent time-series of data on the sources, pathways, levels and effects of pollutants in the Mediterranean Sea and thus to contribute to the scientific knowledge of the Mediterranean Sea.
4. The results of, and experience gained through, MED POL - PHASE I are reflected in the documents listed in the appendix to this annex.

5. The 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 (Geneva, 5-10 February 1979), having examined the status of MED POL PHASE I, recommended that during the 1979/1980 biennium a long-term pollution monitoring and research programme should be formulated and the present document is a response to this request.
6. The legal obligations of the Contracting Parties to the:
 - Convention for the Protection of the Mediterranean Sea Against Pollution; adopted in Barcelona, 16 February 1976; entered into force on 12 February 1978;
 - Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft; adopted in Barcelona, 16 February 1975; entered into force on 12 February 1978;
 - Protocol Concerning Co-operation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency; adopted in Barcelona, 16 February 1976; entered into force on 12 February 1978;
 - Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources; adopted in Athens, 17 May 1980;
7. Based on the recommendations made at various expert and intergovernmental meetings, this draft long-term (10 years) programme for pollution monitoring and research (MED POL - PHASE II) was formulated by the secretariat of the Convention (UNEP) in co-operation with the organizations which have supported the MED POL - PHASE I and is submitted to the Contracting Parties to the Barcelona Convention for their consideration and approval.

OBJECTIVES

8. The general long-term objective of MED POL - PHASE II is to further the goals of the Barcelona Convention by assisting the Parties to prevent, abate and combat pollution of the Mediterranean Sea Area and to protect and enhance the marine environment of the Area. The specific objectives are designed to provide, on a continuous basis, the Parties to the Barcelona Convention and its related protocols with:
 - information required for the implementation of the Convention and the protocols,
 - indicators and evaluation of the effectiveness of the pollution prevention measures taken under the Convention and the protocols,

- scientific information which may lead to eventual revisions and amendments of the relevant provisions of the Convention and the protocols and for the formulation of additional protocols,
 - information which could be used in formulating environmentally sound national, bilateral and multilateral management decisions essential for the continuous socio-economic development of the Mediterranean region on a sustainable basis,
 - periodic assessment of the state of pollution of the Mediterranean Sea.
9. These objectives will be achieved through the evaluation of the information on the sources, amounts, levels, trends, pathways and effects of pollutants in the Mediterranean which will be collected, analysed and reported on a systematic basis using commonly agreed methods, and taking into account data available from other sources.

PRINCIPLES

10. The basic principles used in the development of MED POL - PHASE II are listed below:
- (a) Mechanisms which will be used for MED POL - PHASE II related to policy making:
- periodic meetings of Contracting Parties to decide on the programme, approve its budget, review its progress and evaluate its results;
 - periodic meetings of the Working Group for Scientific and Technical Co-operation which will consist of national MED POL co-ordinators designated by the relevant national authorities to assist the Contracting Parties in reviewing the progress of the programme and in evaluating the results thereof, and to prepare relevant recommendations for submission, through UNEP, as the secretariat of the Convention, to the meetings of the Contracting Parties.
- (b) The monitoring of, and research on, pollutants affecting the Mediterranean marine environment will reflect primarily the immediate and long-term requirements of the Barcelona Convention and its protocols (including those protocols which are in their formative stage) but will also take into account factors needed for the understanding of the relationship between the socio-economic development of the region and the pollution of the Mediterranean Sea.

- (c) The strategy of the programme will be such as to provide information on pollution trends within the Mediterranean recognizing that the dynamics of the system are such that pollution in one area can cause detrimental effects in other areas.
- (d) For this purpose, monitoring will be organized on several levels:
- monitoring of sources of pollution providing information on the type and amount of pollutants released directly into the environment;
 - monitoring of nearshore areas, including estuaries, under the direct influence of pollutants from identifiable primary (outfalls, discharge and coastal dumping points) or secondary (rivers) sources;
 - monitoring of offshore areas (reference areas) providing information on the general trends in the level of pollution in the Mediterranean;
 - monitoring of the transport of pollutants to the Mediterranean through the atmosphere, providing additional information on the pollution load reaching the Mediterranean Sea.
- (e) Studies and research undertaken in the framework of the programme will be directly relevant to the achievement of the objectives of the programme.
- (f) PHASE II will be based primarily on the experience and results obtained during PHASE I, but will also take into account the experience gained through other large-scale national, bilateral or multilateral research and monitoring programmes carried out in the Mediterranean and in other regions of the world.
- (g) The work will be carried out by national research centres, which will not necessarily have to carry out all the aspects of the programme, in particular those which actively participated in PHASE I, taking into account the need for adequate geographic coverage. These centres will be designated by the relevant national authorities and will be named "collaborating UNEP MED POL centres" after demonstrating their relevant technical competence. Participation of national institutions in the work will be formalized through contracts based on proposals submitted to the Mediterranean Action Plan Co-ordinating Unit in response to requests.
- (h) The results of PHASE II will be collated, processed and disseminated by the unit co-ordinating the Mediterranean Action Plan in co-operation with the relevant specialized organizations of the UN system. The International Computing Centre (ICC) in

Geneva will be used for data processing according to agreed standard practices, making full use of existing mechanisms for data exchange.

- (i) Data generated in PHASE II will be comparable, to the largest extent feasible, with those obtained during PHASE I and with those generated through UNEP-sponsored regional seas programmes in other regions, thus contributing to the Global Environment Monitoring System (GEMS), and furthering the concept of integrated monitoring of the environment. The inter-regional comparability of data will be assured through UNEP's Regional Seas Programme Activity Centre.
- (j) The overall co-ordination of MED POL - PHASE II will be vested in the Mediterranean Action Plan Co-ordinating Unit, acting on behalf of UNEP (the secretariat of the Barcelona Convention).
- (k) The day-to-day co-ordination of the work carried out by national institutions participating in MED POL - PHASE II will be achieved through an "interagency team" consisting of staff from relevant international organizations.
- (l) Mechanisms which will be used, as appropriate, for the analysis of data and their initial evaluation are:
 - the unit co-ordinating the Mediterranean Action Plan;
 - the "interagency team";
 - the meetings of representatives of national centres participating in the programme;
 - the Working Group for Scientific and Technical Co-operation;
 - experts, selected by the unit co-ordinating the Mediterranean Action Plan and the "interagency team", acting in their personal capacity;
 - periodic meetings of scientists participating in the programme to discuss the progress made in the projects and the future programme.
- (m) Financial resources for the implementation of PHASE II are:
 - (i) cash from:
 - Mediterranean Trust Fund;
 - UNEP's Fund;
 - voluntary contributions.
 - (ii) contributions in kind, services and activities related to the Mediterranean Action Plan from:

- collaborating national centres;
- Governments of the Mediterranean States and the EEC;
- specialized organizations participating in the programme.

MONITORING

11. Several types of monitoring will be undertaken, all contributing to the fulfillment of the principles contained in paragraph 10.
 - A. Monitoring of sources of pollution to provide information on the type and amount of pollutants reaching the marine environment from coastal sources.
12. The purpose of this monitoring is to establish the pollution load reaching the Mediterranean Sea and to contribute to the understanding of biogeochemical cycles of pollutants relevant to the Mediterranean Sea. It will cover the:
 - (a) Survey of the type and amount of pollutants discharged directly into the coastal waters from land-based (coastal) sources;
 - (b) Survey of the type and amount of pollutants dumped directly into the sea;
 - (c) Survey of the type and amount of pollutants dumped in emergency or released accidentally into the sea;
 - (d) Assessment of the type and amount of selected substances reaching the sea directly through natural (weathering, hydrothermal, etc.) processes from land-based (coastal) or maritime sources.
13. Pollutants to be monitored include:
 - (a) Pollutants listed in annex II of the Land-Based Sources Protocol (paragraph 12 (a)).
 - (b) Pollutants listed in annex II of the Dumping Protocol (paragraph 12(b)).
 - (c) Pollutants referred to in Article 8 and Article 9 of the Dumping Protocol (paragraph 12(c)).
 - (d) Pollutants referred to in Article 8 of the Emergency Protocol (paragraph 12(c)).
 - (e) Substances which may contribute significantly to the overall level (concentration) of pollutants in the sea (paragraph 12(d)).

14. The monitoring will be based on:
- (a) Reports to be submitted by the Contracting Parties according to Article 7, Article 8 and Article 9 of the Dumping Protocol.
 - (b) Reports to be submitted by the Contracting Parties according to Article 8 and Article 9 of the Emergency Protocol.
 - (c) Reports to be submitted by the Contracting Parties according to Article 6 and Article 13 of the Land-Based Sources Protocol.
 - (d) Reports to be submitted by the Contracting Parties on monitoring of sources for substances which may contribute substantially to the overall level (concentration) of pollutants in the sea (paragraphs 12(d) and 13(c)). Data will be generated by national research centres designated by their governments to participate in the programme.
- B. Monitoring of the coastal waters, including estuaries, within the limits defined by Article 1 of the Barcelona Convention and by Article 3 of the Land-Based Sources Protocol, under the direct influence of pollutants from identifiable primary (e.g. outfalls, discharge or coastal dumping points) or secondary (rivers and other water courses) sources.
15. The purpose of this monitoring is to establish the effects of measures taken by Contracting Parties under Land-Based Sources Protocol (Article 8(b)).
16. The monitoring will be carried out by governmentally selected national research centres to monitor areas within their national jurisdiction for the following parameters (indicators) selected on the basis of:
- (a) scientific and economic feasibility
 - (b) specific needs of the Mediterranean, i.e. relevance to the annexes I and II of the Land-Based Sources Protocol
 - (c) identifiable cause-effect relationship.
17. For general monitoring purposes of coastal waters (i.e. not in the heavily polluted areas in the vicinity of point sources) the following priority parameters (indicators) will be taken into account initially:
- total mercury in organisms and sediments
 - cadmium in organisms
 - high-molecular weight halogenated hydrocarbons in organisms and sediments

- petroleum hydrocarbons in water, sediments and oil residues (tar-balls) on sea-shores
- fecal coliforms in recreational waters and edible bivalves
- basic oceanographic and meteorological conditions

In addition, standard physical and chemical parameters (salinity, oxygen, temperature, etc.) which may contribute to the interpretation of the results, will be monitored.

18. It is envisaged that after 3 years the following additional parameters (indicators) for monitoring of coastal waters will be added to the list:

- cadmium in sediments
- organic mercury in organisms and sediments
- total arsenic in organisms
- selenium in organisms
- lead in organisms
- polynuclear aromatic hydrocarbons in organisms
- additional organics (such as carcinogenic compounds) in organisms
- radionuclides in organisms
- fecal coliforms in sediments
- pathogens in waters, sediments and bivalves
- ecological parameters, such as productivity and community structure.

19. Taking into account the specificity of estuaries, the parameters (indicators) to be monitored will initially include:

- total mercury in water and suspended matter
- cadmium in water and suspended matter
- high-molecular weight halogenated hydrocarbons in water and suspended matter
- fecal coliforms in water and suspended matter
- phosphorus in water and suspended matter

- nitrogen in water and suspended matter
 - BOD₅ in water
 - COD in water
20. It is envisaged that after 3 years, the following additional parameters (indicators) for monitoring of estuaries will be added to the list:
- total arsenic in water and suspended matter
 - organic mercury in water and suspended matter
 - selenium in water and suspended matter
 - lead in water and suspended matter
 - polynuclear aromatic hydrocarbons in water and suspended matter
 - radionuclides in water and suspended matter
 - oil residues in water and suspended matter
 - pathogens in water
 - phenols in water
- C. Monitoring of reference areas, as defined by Article I of the Convention, which are not under direct influence of pollutants from identifiable primary or secondary sources.
21. The purpose of this monitoring is to provide information on the general trends in the level (concentration) of pollutants in the Mediterranean Sea.
22. The monitoring will be based on the work of governmentally selected national research centres which will monitor areas falling within their jurisdiction. Monitoring of areas outside of national jurisdiction will be agreed jointly by governments concerned.
23. The selection of reference areas will take into account the present knowledge of the prevailing conditions and other relevant regional programmes in the Mediterranean Sea.
24. Parameters (indicators) recommended to be monitored in the reference areas are primarily those listed in paragraph 17, with the exception of micro-organisms.

D. Monitoring of the transport of pollutants to the Mediterranean Sea through the atmosphere.

25. The purpose of this monitoring is to establish the input (flux) of pollutants into the Mediterranean Sea through the atmosphere and thus to provide additional information on the pollution load reaching the Mediterranean Sea.
26. The monitoring will be based on the work of national research centres designated by their governments.
27. The monitoring areas will include (i) areas directly influenced by identifiable sources of air pollution and (ii) reference areas not directly influenced by identifiable sources of air pollution.
28. Monitoring of areas outside of national jurisdiction, or under shared jurisdiction by two states, will be agreed jointly by the governments concerned.
29. Parameters (indicators) to be monitored will be selected on the basis of their relevance to the annex I and annex II of the Land-Based Sources Protocol and of a feasibility study and research which will be carried out.

E. Sampling and analytical techniques.

30. Sampling and analytical techniques used in the monitoring will be based on mandatory reference methods. Other methods could also be used, including remote sensing, subject to a satisfactory intercomparison.
31. Reference methods developed and tested during MED POL - PHASE I include:
 - (a) Determination of total mercury in edible tissue of fish by flameless atomic absorption spectrophotometry after liquid pressure decomposition of the organic material
 - (b) Determination of total mercury in edible tissue of mussels by flameless atomic absorption spectrophotometry after liquid pressure decomposition of the organic material
 - (c) Determination of DDTs in edible tissues of shrimps and fish by gas-liquid chromatography
 - (d) Determination of DDTs in edible tissue of mussels by gas-liquid chromatography
 - (e) Determination of total coliforms in sea-water by the membrane filtration culture method

- (f) Determination of fecal coliforms in sea-water by the membrane filtration culture method
 - (g) Determination of faecal streptococci in sea-water by the membrane filtration culture method
 - (h) Determination of faecal coliforms in shellfish (bivalves) by the multiple-test-tube method (MPN)
32. Additional reference methods will be developed and tested during MED POL - PHASE II (see paragraph 42(a)).
33. Sampling frequency will depend on the purpose of monitoring.
34. All national research centres will participate in the continuing intercalibration of sampling and analytical techniques or in data quality control programmes.
- F. Data analysis and dissemination.
35. Data will be subjected to a preliminary quality control and analysis by the national research centres or other organizations collecting them.
36. Depending on their nature, the data will be reported through the national MED POL focal points, (or directly, if so decided by the relevant MED POL focal points) in an agreed format and according to an agreed schedule, to UNEP's Mediterranean Action Plan Co-ordinating Unit, or through the Regional Oil Combating Centre or through the interagency Team. On this level, using the computer facilities of the International Computing Center in Geneva, the second analysis of data will be carried out, including the control of their quality, (data validation), and the first integration of data will be achieved on a Mediterranean scale.
37. Periodic and ad hoc expert groups should be convened by UNEP and/or the relevant specialized organizations to assist in the analysis, integration and interpretation of data.
38. Before submitting the data and the reports prepared by UNEP on the basis of these data to the Contracting Parties and other users they will be reviewed by the Working Group for Scientific and Technical Co-operation.
39. The type of regular reports to be submitted to the Contracting Parties in connection with MED POL - PHASE II are:
- (a) Type and amount of pollutants directly entering the Mediterranean Sea from land-based sources. The report will be based on the analysis and evaluation of data reported according to the provisions contained in paragraph 14 of this document. It will be submitted to the regular (biennial) meetings of the Contracting Parties.

(b) Quality of the marine environment in the areas monitored under MED POL - PHASE II. The report will consist of:

- collated reports on the quality of the areas monitored according to paragraphs 15-29 of this document, as submitted to the Co-ordinating Unit of the Mediterranean Action Plan from the national MED POL focal points in a commonly agreed format;
- analysis, evaluation and interpretation of the results contained in the reports on the areas monitored according to paragraphs 15-29 of this document.

The report will be submitted to the regular (biennial) meetings of the Contracting Parties.

(c) Results of selected research and study topics as defined in paragraph 42 of this document.

(d) Periodically updated report on the state of pollution of the Mediterranean Sea, indicating the major environmental problems, general trends in the pollution of the Mediterranean as well as the environmental problems which may face the Mediterranean basin in the future.

RESEARCH AND STUDY TOPICS

40. Only research and studies directly relevant to the achievement of the objectives of MED POL - PHASE II are envisaged.
41. Research and studies will be carried out by Mediterranean research centres and organizations primarily on a direct contractual basis or as a contribution from centres and organizations offered by the Contracting Parties.
42. Research and study topics included initially in the MED POL - PHASE II (sequence does not imply order of priority):
 - (a) Development of sampling and analytical techniques for monitoring the sources and levels of pollutants. Testing and harmonization of these methods at the Mediterranean scale and their formulation as reference methods. Substances listed in Dumping and Land-Based Sources Protocol priorities.
 - (b) Development of reporting formats required according to the Dumping, Emergency and Land-Based Sources Protocols.
 - (c) Formulation of the scientific rationale for the environmental quality criteria to be used in the development of emission standards, standards of use or guidelines for substances listed in annexes I and II of the Land-Based Sources Protocol in accordance with Articles 5,6 and 7 of that Protocol.

- (d) Epidemiological studies related to the confirmation (or eventual revision) of the proposed environmental quality criteria (standards of use) for bathing waters, shellfish-growing waters and edible marine organisms.
- (e) Development of proposals for guidelines and criteria governing the application of the Land-Based Sources Protocol, as requested in Article 7 of that Protocol.
- (f) Research on oceanographic processes, with particular emphasis on surface circulation and vertical transport. Needed for the understanding of the distribution of pollutants through the Mediterranean and for the development of contingency plans for cases of emergency.
- (g) Research on the toxicity, persistence, bioaccumulation, carcinogenicity and mutagenicity of selected substances listed in annexes of the Land-Based Sources Protocol and the Dumping Protocol.
- (h) Research on eutrophication and concomittant plankton blooms. Needed to assess the feasibility of alleviating the consequences and damage from such recurring blooms.
- (i) Study of ecosystem modifications in areas influenced by pollutants, and in areas where ecosystem modifications are caused by large-scale coastal or inland engineering activity.
- (j) Effects of thermal discharges on marine and coastal ecosystems, including the study of associated effects.
- (k) Biogeochemical cycle of specific pollutants, particularly those relevant to human health (mercury, lead, survival of pathogens in the Mediterranean Sea, etc.).
- (l) Study of pollutant-transfer processes (i) at river/sea and air/sea interface, (ii) by sedimentation and (iii) through the straits linking the Mediterranean with other seas.

ASSISTANCE COMPONENT

- 43. In addition to the assistance envisaged through the activities of the Regional Oil Combating Centre, direct assistance in the fields of science, education and technology related to MED POL - PHASE II will be provided as described in the following paragraphs.
- 44. Individual and collective training will be provided for scientists and technicians in techniques (methods) required for their effective participation in monitoring and research envisaged in the framework of MED POL - PHASE II. This assistance will be in the form of

fellowships, experts, workshops, seminars, study tours, grants for attendance to meetings, etc., and will cover training in analytical and sampling techniques, data processing, interpretation of results and various research topics.

45. Training for technicians and administrators will be organized in order to facilitate the application of the Land-Based Sources and the Dumping Protocols. The forms of training will be similar to those mentioned in the preceding paragraph.
46. A quality control programme will be a part of MED POL - PHASE II to ensure the highest degree of quality and of comparability of data. The national research centres participating in monitoring will receive standards and reference substances enabling them to participate in the continuing Mediterranean and global intercalibration exercise. Weaknesses detected through the quality control programme will be corrected through additional training and technical assistance, whenever necessary.
47. The common maintenance services for the sophisticated analytical equipment (atomic absorption spectrophotometers, gas chromatographs, etc.), developed during MED POL - PHASE I, will remain at the disposal of participants in PHASE II enabling the proper functioning of the equipment used by national research centres.
48. Standardized material and some equipment will be put at the disposal of national centres participating in MED POL - PHASE II to enable their full participation in the monitoring and research programme.

CO-ORDINATION

49. The periodic meetings of the Contracting Parties will decide on the programme, approve its budget, review its progress and evaluate its results.
50. A standing Working Group for Scientific and Technical Co-operation will be established by the Contracting Parties to assist them in their review of the progress of the programme and the evaluation of the results. It will advise UNEP on technical and policy matters related to the programme and prepare recommendations for submission through UNEP, as the secretariat of the Convention, to the meetings of Contracting Parties. The Group will consist of national MED POL co-ordinators designated by the relevant national authorities and will meet at least once a year.
51. The overall co-ordination of MED POL - PHASE II will be exercised by UNEP, through the Mediterranean Action Plan Co-ordinating Unit.
52. The day-to-day technical co-ordination of the work carried out by national institutions will be achieved through an "inter-agency team" consisting of staff from the participating international organizations.

53. The data quality control programme (paragraph 46) and maintenance services (paragraph 47) will be organized and carried out by competent international organizations or selected national institutions including those performing these programmes on a global level, under the overall guidance of the Mediterranean Action Plan Co-ordinating Unit.
54. In addition to the organizations belonging to the United Nations system, the collaboration with other competent international, regional and intergovernmental organizations in the implementation of MED POL - PHASE II will be actively pursued.

BUDGETARY CONSIDERATIONS

55. The financial resources needed for the work envisaged in the framework of MED POL - PHASE II will come from:
 - (a) Contracting parties to the Barcelona Convention (cash contributions through the Mediterranean Trust Fund and contributions in kind through participation of their national institutions).
 - (b) UNEP (cash contributions on a project funding basis and contributions in kind through certain services).
 - (c) National institutions participating in the programme (contributions in kind through services, staff time, etc.).
 - (d) International organizations participating in and supporting the programme (contributions in kind through services, staff time, and activities related to the Mediterranean Action Plan).
 - (e) Voluntary contributions.

List of selected documents relevant to the development and results
of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme
(MED POL - PHASE I)

Report of the IOC/GFCM/ICSEH International Workshop on Marine Pollution in
the Mediterranean (Monte-Carlo, 9-14 September 1974), UNESCO 1974.

Project on Pollution in the Mediterranean (Msida, 8 - 13 September 1975)
IOC/MPPP/3, UNESCO 1975.

Report of the FAO(GFCM)/UNEP Expert Consultation on the Joint Co-ordinated
Project on Pollution in the Mediterranean (Rome, 23 June - 4 July 1975),
FAO 1975.

Report of the WHO/UNEP Expert Consultation on Coastal Water Quality Control
Programme in the Mediterranean (Geneva, 15 - 19 December 1975), EHE/76.1,
WHO 1976.

Directory of Mediterranean Marine Research Centres. First Edition UNEP
1976.

Manual of Methods in Aquatic Environment Research. Part 2 : Guidelines
for the Use of Biological Accumulators in Marine Pollution Monitoring.
FAO Fisheries Technical Paper No. 150. FAO 1976.

Manual of Methods in Aquatic Environment Research. Part 3 : Sampling and
Analysis of Biological Material. FAO Fisheries Technical Paper No. 158.
FAO 1976.

Guidelines for Health Related Monitoring of Coastal Water Quality. Report
of a meeting of WHO/UNEP Joint Group of Experts (Rovinj, Yugoslavia, 23 -
25 February 1977). WHO 1977.

Health Criteria and Epidemiological Studies Related to Coastal Water
Pollution. Report of a meeting of WHO/UNEP Joint Group of Experts (Athens,
1 - 4 March 1977). WHO 1977.

Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED
POL). Summary Report of the Mid-term Review Meeting on IOC/WMO/UNEP and
IOC/UNEP Pilot Projects, (Barcelona, 23 - 27 May 1977).
IOC-WMO-UNEP/MED-MRM/3. UNESCO 1977.

Guidelines for the Implementation of Pilot Projects MED I and MED VI.
Supplements 1 and 3 to IOC-WMO-UNEP/MED-MRM/3. UNESCO 1977.

Manual for Monitoring Oil and Petroleum Hydrocarbons in Marine Waters and
on Beaches. Supplement to manuals and guides No.7. UNESCO 1977.

Mid-term Review of the Joint WHO/UNEP Co-ordinated Pilot Project on Coastal Water Quality Control in the Mediterranean. Report of the meeting of principal investigators of collaborating laboratories (Rome, 30 May - 1 June 1977). WHO 1977.

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Selected Bibliography on Studies and Research Relevant to Pollution in the Mediterranean. FAO Fisheries Technical Paper No. 165. FAO 1977.

Directory of Mediterranean Marine Research Centres. Second Edition. UNEP 1977.

Preliminary Report on the State of Pollution of the Mediterranean Sea. UNEP/IG.11/INF.1. UNEP 1978.

Monitoring of Recreational Coastal Water Quality and Snellfish Culture Areas. Report of a joint WHO/UNEP Seminar (Rome, 4 - 7 April 1978). WHO 1978.

Coastal Quality Monitoring of Recreational and Snellfish Areas (MED VII). Report of a Workshop jointly convened by WHO and UNEP. (Rome, 17 - 19 January 1979). WHO 1979.

Pollutants from Land-Based Sources in the Mediterranean. (Report prepared in collaboration with ECE, UNIDO, FAO, UNESCO, WHO, IAEA). UNEP/WG.18/INF.4. UNEP 1979.

Manual of Methods in Aquatic Environment Research. Part 5 : Statistical Tests. FAO Fisheries Technical Paper No. 182. FAO 1979.

Principles and Guidelines for Discharge of Wastes into the Marine Environment. WHO 1979.

Data Profiles for Chemicals for the Evaluation of their Hazards to the Environment of the Mediterranean Sea. Vols. I and II. IRPTC/UNEP 1979.

Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL). Programme description. UNEP/IG.14/INF.3. UNEP 1979.

Summary Reports on the Scientific Results of MED POL. Parts I, II and III. UNEP/IG.18/INF.3. UNEP 1980.

Selected Bibliography on the Pollution of the Mediterranean Sea (prepared in collaboration with FAO, WHO, IOC, WHO, IAEA and UNEP). (in preparation).

Reference Methods for Marine Pollution Studies in the Mediterranean
(prepared in collaboration with FAO, WHO, IOC, IAEA and UNEP). (in
preparation).

The State of Pollution of the Mediterranean Sea. Pergamon Press/UNEP (in
preparation).