



United Nations
Environment
Programme



Distr.
RESTRICTED

UNEP/WG.62/3/Rev.1
17 February 1982

Original: ENGLISH

First Meeting of the Working Group on
Scientific and Technical Co-operation

Athens, 28 September - 2 October 1981



LONG-TERM POLLUTION MONITORING AND RESEARCH PROGRAMME

MED POL - PHASE II

Basic Criteria for the Implementation of National Monitoring Programmes



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Basic Principles for the Implementation of National Monitoring Programmes

Introduction

The Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution, have the full responsibility of the monitoring activities at the national level (article 10) of the Convention; article 4) of the Protocol Concerning Co-operation in Combating Pollution of the Mediterranean Sea by Oil and Other Substances in Cases of Emergency; and article 8) of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources/.

The 2nd meeting of the Contracting Parties to the Convention and its related protocols endorsed a Long-term Pollution Monitoring and Research Programme (designated as MED POL - PHASE II), whose basic details were laid down in annex V to the report of that meeting (UNEP/IG.23/11). (Attached as Annex IV to this document).

UNEP, responsible to the Contracting Parties for the overall co-ordination of the activities and for their harmonization in the various regional seas will assist the Governments through the Mediterranean Co-ordinating Unit (MED UNIT) to organize their national monitoring programmes.

Taking into account the previous terms of reference, as well as the experience gained through the pilot phase of the Mediterranean Pollution Monitoring and Research Programme (MED POL - PHASE I) the MED UNIT, in close collaboration with the Co-operating Agencies (WHU, FAO, IAEA, IOC, WMO and Unesco), has prepared the present document aiming at the establishment of general principles applicable, in greater or lesser extent to all the Mediterranean countries.

The present document contains a draft Agreement (annex I) to be signed between each of the Governments and UNEP; an outline of Technical Annex (annex II), which, on completion, should contain the modalities of the technical co-operation between each of the Governments and UNEP, and constitute the corresponding National Monitoring Programme; and the Guidelines for the Preparation of the Technical Annex (annex III), which were prepared on the basis of the experience gained through the pilot phase of MED POL as well as on the requirements of the Convention for the Protection of the Mediterranean Sea against Pollution and related Protocols (Land-based Sources, Dumping and Emergency Protocols).

The First Meeting of the Working Group for Scientific and Technical Co-operation (WGSIC) reviewed the present document and made recommendations for the implementation of the monitoring activities which were included in the present revision. The MED UNIT shall subsequently prepare, in order to assist the Mediterranean Governments, detailed proposals for each

individual National Monitoring Programme which shall then be studied and further elaborated by the competent national authorities in charge of the implementation of the monitoring activities. The MED UNIT and the Co-operating Agencies will be ready, at any time, to assist the National Co-ordinators in this task. Signature of the Agreement should immediately follow the acceptance of its Technical Annex by the respective Government and UNEP. It should be possible to begin these activities during 1982.

National Monitoring Programme

The National Monitoring Programmes should be organized in such a way that allow the Contracting Parties to further the goals of the Convention and to successfully implement the environmental assessment required by the Protocols.

These objectives shall be achieved through the periodic evaluation of the information provided by the Parties on the sources, amounts, levels, trends, pathways and effects of pollutants in the Mediterranean. This information shall be systematically collected, analysed and reported using commonly agreed methods.

In addition to the monitoring, the research activities should facilitate the involvement of the scientific community in the monitoring activities and thus give scientific value to the data produced, providing real scientific insight into the role of pollutants in the marine system and the mechanisms which control the system itself. It should also contribute to the improvement of the programmes and monitoring methods and to develop the scientific capabilities of various Mediterranean countries which are still behind the average in their technological capabilities.

The National Monitoring Programmes will include a workplan for the monitoring of the sources and of the coastal, and reference areas clearly stating geographic boundaries, sampling sites and frequency, analytical techniques, equipment available and its current state, sea-going facilities, institutional arrangements and any other relevant information including financial and human resources and national and international contributions in kind or in cash.

General Co-ordination

The co-ordination of the MED POL - PHASE II monitoring activities will be carried out by the MED UNIT as part of its responsibilities. In addition, the MED UNIT will be responsible:

1. in consultation with the Co-operating Agencies, for the day-to-day co-ordination of the work carried out by the national collaborating MED POL institutions;

2. in consultation with the relevant Co-operating Agencies, for the collection, evaluation, processing and dissemination of the results of the MED POL - PHASE II and the assessment of the state of pollution in the Mediterranean Sea;
3. in consultation with the relevant Co-operating Agencies, for the convening of the Working Group on Scientific and Technical Co-operation (WGSIC) and of groups of experts, either periodically or on an ad hoc basis, to assist in the analysis, integration and interpretation of MED POL - PHASE II data;
4. for the overall guidance on the data quality control and on the maintenance service organized and carried out by the competent Co-operating Agencies or selected national institutions.

National Co-ordination

The co-ordination of the national monitoring activities will be carried out by the National Co-ordinators for MED POL as indicated in paragraph 45 of UNEP/IG.25/11 and recommended in Annex V to the same document. More specifically the National Co-ordinators for MED POL will:

1. ensure the implementation of the national monitoring programme and co-ordinate the efforts of the designated MED POL collaborating institutions in carrying out the monitoring.
2. designate national research centres and organizations to be considered as MED POL collaborating institutions to participate in the monitoring programme and to be considered for the research activities.
3. channel all formal communications between the MED UNIT and the national MED POL collaborating institutions and report to the MED UNIT the progress achieved by the national monitoring programme according to the agreed format and schedule.
4. provide the MED UNIT with the data submitted by the national MED POL collaborating institutions, ensuring the compliance with the agreed formats and schedules.
5. assess and report as required on the overall amounts of pollutants discharged and dumped from all national sources.
6. assess and report on the state of pollution in the areas monitored by the national MED POL collaborating institutions.

7. be a member of the Working Group on Scientific and Technical Co-operation (WGSIC) that will advise the MED UNIT on technical and policy matters related to the Monitoring and Research Programme, review the technical reports prepared by the MED UNIT and prepare relevant recommendations before submission to the Contracting Parties.

Assistance

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 (Annex V, document UNEP/IG.23/11):

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 at meetings, etc., and will cover training in analytical and sampling techniques, data processing, interpretation of results and various research topics.

Training for technicians and administrators will be organized in order to facilitate the application of the Land-based Sources and Dumping Protocols. The forms of training will be similar to those mentioned in the preceding paragraph.

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.

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 thus enabling the equipment used by national research centres to function properly.

As required and to the extent possible, standardized material and some equipment will be put at the disposal of national centres participating in MED POL - PHASE II to make it possible for them to participate fully in the monitoring and/or research programme.

With regard to the assistance provided by the MED UNIT for the implementation of the National Monitoring Programmes, the WGSTC recommended that the costs of the work undertaken should be borne, for the main part, by the Contracting Parties, and that for a transitional period of one year, the assistance provided by the MED UNIT will not have to be approved by the WGSTC.

Assistance will, however, be treated as a priority criterion, in accordance with the Cannes conclusions (see annex iv), as well as geographical distribution.

The MED UNIT will provide the National Co-ordinators for MED POL with details of the agreements between UNEP and the Contracting Parties, and between the MED UNIT and the Co-operating Agencies.

ANNEX I

LONG-TERM POLLUTION MONITORING AND RESEARCH PROGRAMME

(MED POL - PHASE II)

DRAFT

AGREEMENT

between

The Government of

.....

and

The United Nations Environment Programme

AGREEMENT BETWEEN

The Government ofas signatory to the Convention for the Protection of the Mediterranean Sea against Pollution (hereinafter referred to as the Barcelona Convention); and

UNEP, designated by the Contracting Parties to the Barcelona Convention (hereinafter referred to as the Contracting Parties), as the organization responsible for carrying out the secretariat functions for the Barcelona Convention and its related protocols.

1. The legal obligations of the Contracting Parties, and in particular
 - article 10) of the Barcelona Convention, which entered into force on 12 February 1978;
 - article 4) of the Protocol Concerning Co-operation in Combating Pollution of the Mediterranean Sea by Oil and other Substances in Cases of Emergency, which entered into force on 12 February 1978; and
 - article 8) of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, adopted on 1/ May 1980,require the establishment of a pollution monitoring system in the Mediterranean Sea.
2. Based on the recommendations made at various intergovernmental and expert meetings, a Long-Term Programme for Pollution Monitoring and Research (hereinafter referred to as MED POL - PHASE II) was formulated and approved by the Second Meeting of the Contracting Parties held in Cannes, 2-7 March 1981 (UNEP/IG.23/11, annex V), and will be attached as annex I to this agreement.
3. The present agreement is aimed at assisting the Government of in the implementation of its National Monitoring Programme, and specifies in its Technical Annex the modalities of co-operation between the signatories.
4. This agreement and its annexes shall be valid for an initial period of three years (1982 - 1984) and may be extended, amended, changed, or terminated by mutual consent of both parties.

5. Any modifications made in MED POL - PHASE II at the forthcoming meetings of the Contracting Parties shall automatically apply to the present agreement.

For and on behalf of

The United Nations Environment
Programme

Name

Title

Date

The Government of

.....

Name

Title

Date

ANNEX II

LONG-TERM POLLUTION MONITORING AND RESEARCH PROGRAMME

(MED PDL - PHASE II)

TECHNICAL ANNEX

NATIONAL MONITORING PROGRAMME

OF

.....

TECHNICAL MODALITIES OF CO-OPERATION BETWEEN THE
GOVERNMENT OF..... AND UNEP ON
POLLUTION MONITORING RELEVANT TO THE PROVISIONS OF THE
CONVENTION FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST
POLLUTION AND ITS RELATED PROTOCOLS

Terms of reference

The Long-Term Programme for Pollution Monitoring and Research (hereinafter called MED POL - PHASE II), provides the basic framework for activities to be carried out as the National Monitoring Programme of

The present document describes the technical modalities of co-operation under the Agreement of which this Technical Annex is part, and has been prepared following the Guidelines approved by the First Meeting of the Working Group on Scientific and Technical Co-operation for MED POL (UNEP/WG.62/7).

National Co-ordination

The co-ordination of the national monitoring activities will be carried out by the National Co-ordinator for MED POL (hereinafter referred to as the National Co-ordinator) as indicated in paragraph 45 of UNEP/IG.23/11 and recommended in Annex V to the same document. More specifically the National Co-ordinator will:

1. ensure the implementation of the national monitoring programme and co-ordinate the efforts of the designated MED POL collaborating institutions in carrying out the monitoring.
2. designate national research centres and organizations to be considered as MED POL collaborating institutions to participate in the monitoring programme and to be considered for the research activities.
3. channel all formal communications between the Co-ordinating Unit of the Mediterranean Action Plan (hereinafter referred to as MED UNIT) and the national MED POL collaborating institutions and report to the MED UNIT the progress achieved by the national monitoring programme according to the agreed format and schedule.
4. provide the MED UNIT with the data submitted by the national MED POL collaborating institutions, ensuring the compliance with the agreed formats and schedules.

5. assess and report as required on the overall amounts of pollutants discharged and dumped from all national sources.
6. assess and report on the state of pollution in the areas monitored by the national MED POL collaborating institutions.
7. be a member of the Working Group on Scientific and Technical Co-operation (WGSIC) that will advise the MED UNIT on technical and policy matters related to the Monitoring and Research Programme, review the technical reports prepared by the MED UNIT and prepare relevant recommendations before submission to the Contracting Parties.

General Co-ordination

The co-ordination of the MED POL - PHASE II monitoring activities will be carried out by the MED UNIT as part of its responsibilities. In addition, the MED UNIT will be responsible:

1. in consultation with the Co-operating Agencies, for the day-to-day co-ordination of the work carried out by the national collaborating MED POL institutions;
2. in consultation with the relevant Co-operating Agencies, for the collection, evaluation, processing and dissemination of the results of the MED POL - PHASE II and the assessment of the state of pollution in the Mediterranean Sea;
3. in consultation with the relevant Co-operating Agencies, for the convening of the Working Group on Scientific and Technical Co-operation (WGSIC) and of groups of experts, either periodically or on an ad hoc basis, to assist in the analysis, integration and interpretation of MED POL - PHASE II data;
4. for the overall guidance on the data quality control and on the maintenance service organized and carried out by the competent Co-operating Agencies or selected national institutions.

Channels of communications

All formal communications related to the implementation of this agreement will be between

- the MED UNIT, and
- the National Co-ordinator on behalf of the Government
of

The correspondence between the MED UNIT and the National Co-ordinator shall be routinely copied to the national focal point for the Mediterranean Action Plan, which is:

and to

Activities agreed to be carried out

MONITORING OF SOURCES OF POLLUTION TO PROVIDE INFORMATION ON THE
TYPE AND AMOUNT OF POLLUTANTS REACHING THE MARINE ENVIRONMENT
FROM COASTAL SOURCES

A.1 Selection of the sources of pollutants which shall be monitored.

A.1.1 Identification of sources:

A.1.1.1 All dumping operations of wastes or other matter, either in normal operations, in emergency situations or released accidentally into the sea, through special and/or general permits issued.

A.1.1.2 All discharges of pollutants from land-based sources, in particular from outfalls discharging into the sea or through coastal disposal and from fixed man-made, off-shore structures which are under national jurisdiction and which serve purposes other than exploration and exploitation of mineral resources of the continental shelf and the seabed and its sub-soil, through authorizations granted.

A.1.2 Selection of sources:

From the sources identified in A.1.1, the following will be monitored:

A.1.2.1 All wastes dumped under special and general permits.

A.1.2.2 Outlets of the following urban agglomerations:

Sampling Station	Name of Town	Location	Population

A.1.2.3 Effluents of the following industries:

Sampling Station	Name of Industry	Location	Main Activity

A.2 Parameters which shall be monitored at each of the sources

A.2.1 For the assessment of total pollutant load reaching the Mediterranean Sea, all those substances listed in annex I and II of the Land-Based Sources and Dumping Protocols will be taken into account.

A.2.2 For the measurement of actual concentrations in each of the sources identified under A.1.2 the following parameters will be retained:

Source name or number <u>1/</u>	Type of source <u>2/</u>	Annual Discharge (m ³ /yr)	Parameters to be monitored <u>3/</u>															
			BOD ₅	CUD	ISS	N	P	FC	DET	PHE	PH*	Hg*	Cd*	Pb	Cr	Zn	HH	RAD
			<u>4/</u>															

1/ Enter number of monitored source (same as under section A.1.2)
2/ Dumpings, Urban, Industrial or Other
3/ See Table 4 of Guidelines for explanation of symbols. Asterisk shows priority parameters.
4/ Enter number of institution responsible for the monitoring (same as under section A.4).

A.3 Working schedule

A.3.1 An assessment of the pollution load reaching the Mediterranean Sea will be carried out during 1982.

A.3.2 Sources identified under A.1.2 will be sampled according to a schedule established after carrying out a study of the production cycle of each pollutant.

A.4 Institutions which shall carry out the monitoring

Number <u>1/</u>	Name of Inst.	Responsible Investigator	Postal Address	Tel. No. and Telex No.
1.				
2.				
3.				
4.				
5.				

1/ Number to the left should be entered in appropriate box under A.2.2.

A.5 Brief description of sampling and analytical techniques (if different from the methods proposed by the MED UNIT).

- Annual discharge of effluent waters
- Biochemical oxygen demand (BOD₅)
- Chemical oxygen demand (COD)
- Total suspended solids (TSS)
- Total nitrogen (N)
- Total phosphorus (P)
- Faecal coliforms (FC)
- Detergents (anionic) (DET)
- Phenols (index) (PHE)
- Petroleum hydrocarbons (PH)
- Total mercury (Hg)
- Total cadmium (Cd)
- Total lead (Pb)
- Total chromium (Cr)
- Total zinc (Zn)
- High-molecular weight chlorinated hydrocarbons (HH)
- Selected Radionuclides (RAD)

A.6 Data and progress reporting

An inventory of the major sources of pollution with complementary information, stating the type and amount of pollutant discharged, treatment given to the discharges, etc., should be reported to the MED UNIT by the end of 1982. An up-dating of this inventory, including all the new authorizations granted should be prepared at the end of each calendar year (Art. 13.2 LBS Protocol).

All special dumping permits granted should immediately be reported to the MED UNIT and all general dumping permits granted should be

reported to the MED UNIT at the end of each calendar year. (Art. 14.2 Dumping Protocol).

Information regarding the actual amounts, nature of the wastes, or other matter dumped under each of the special and general permits, and the actual location and method of dumping should be reported to the MED UNIT at the end of each calendar year.

Data from monitoring of effluents should be reported to the MED UNIT through the National Co-ordinator (or directly, if so decided by the latter) as soon as they are available.

Reports assessing the overall amounts of pollutants discharged and/or dumped during the corresponding period by each country should be reported to the MED UNIT by the National Co-ordinator before the end of each calendar year.

All forms for reporting of dumping permits and dumping operations, for monitoring data reporting and for overall pollutant load reporting, will be provided by the MED UNIT according to the agreed formats.

MONITORING OF THE COASTAL WATERS, INCLUDING ESTUARIES, WITHIN THE
LIMITS DEFINED BY ARTICLE 1 OF THE BARCELONA CONVENTION
AND 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 WATERCOURSES) SOURCES

B.1 Identification of the areas and stations which shall be monitored 1/

Area No: _____

Denomination: _____

Station Name or Number	Geographic Position (Lat. Long.)

1/ Use as many forms as areas and include a map (scale 1:25,000)
of each area showing the sampling stations.

B.2 Parameters and matrices which shall be monitored at each of the stations, with indication of the sampling frequency and responsible institution.
 (Use as many forms as required).

Area No: _____

Denomination: _____

Station name or number	Type of station <u>1/</u>	Sampling depth (m)	Matrix <u>2/</u>	Parameter <u>2/</u>	Sampling frequency <u>3/</u>	Institution <u>4/</u>

1/ Estuarine, Coastal, Reference

2/ See table 5 of Guidelines for explanation.

3/ State whether sampling will be carried out daily, weekly, etc.

4/ Enter number corresponding to the responsible institution under B.4

B.3 Sampling schedule for all the stations
As specified under B.2.

B.4 Institutions which shall carry out the monitoring

Number <u>1/</u>	Name of Inst.	Responsible Investigator	Postal Address	Tel No. and Telex No.
1. /				
2. /				
3.				
4.				
5.				

1/ Number to the left should be entered in appropriate box under B.2.

B.5 Brief description of sampling and analytical techniques (if different from the methods proposed by the MED UNIT).

- Total mercury in estuarine water (Hg)
- Total mercury in organisms (Hg)
- Total mercury in suspended matter (Hg)
- Total mercury in sediments (Hg)
- Total cadmium in estuarine water (Cd)
- Total cadmium in organisms (Cd)
- Total cadmium in suspended matter (Cd)
- High-molecular weight halogenated hydrocarbons in estuarine water (HH)
- High-molecular weight halogenated hydrocarbons in organisms (HH)
- High-molecular weight halogenated hydrocarbons in suspended matter (HH)
- High-molecular weight halogenated hydrocarbons in sediments (HH)
- Oil slick observations (OS)
- Petroleum hydrocarbons dissolved/dispersed in water (PH)
- Petroleum hydrocarbons in sediments (PH)
- Floating tar balls (TR)
- Tar on sea shores (TR)
- Standard physical and chemical parameters (SP&C)
- Faecal coliforms in water (FC)
- Faecal coliforms in edible bivalves (FC)
- Faecal coliforms in sediments (FC)
- Basic oceanographic and meteorological observations (BO&M)
- Total phosphorus in estuarine water (P)
- Total phosphorus in suspended matter (P)

- Total nitrogen in estuarine water (N)
- Total nitrogen in suspended matter (N)
- BOD₅ in estuarine water (BOD₅)
- COD in estuarine water (COD)

B.6 Data and progress reporting

- B.6.1 Data reports will be submitted to the MED UNIT as soon as data become available.
- B.6.2 Progress reports will be submitted to the MED UNIT by the National Co-ordinator at the end of each calendar year.

All the reports should be adapted to the formats and guidelines supplied by the MED UNIT.

MONITORING OF REFERENCE AREAS, AS DEFINED IN ARTICLE 1 OF THE CONVENTION
WHICH ARE NOT UNDER DIRECT INFLUENCE OF POLLUTANTS
FROM IDENTIFIABLE PRIMARY OR SECONDARY SOURCES

The National Co-ordinator should inform of all on-going or prospective cruises in the Mediterranean Sea which might contribute to the objectives stated in the heading, indicating:

- C.1 Identification of reference stations which shall be visited (from the reference areas proposed in Table 7 of Guidelines). Use the same form as under B.1.
- C.2 Parameters and matrices which shall be monitored (from those proposed in Table 8 of Guidelines). Use the same form as that in B.2 entering "R" under the heading "Type of Station".
- C.3 Cruise plan (see section C.3 of Guidelines)
- C.4 Participants in the cruise (with identification of their functions). Use the same form as that in B.4.
- C.5 Brief description of sampling and analytical techniques (if different from those described under B.5)
- C.6 Data and cruise reporting

Data will be reported to the MED UNIT as they become available in accordance with formats developed by the MED UNIT.

Reporting of the standard physical and chemical parameters should follow the rules of the International Oceanographic Data Exchange (IODE) system.

ASSISTANCE

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 (Annex V, document UNEP/IG.23/11):

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 at meetings, etc., and will cover training in analytical and sampling techniques, data processing, interpretation of results and various research topics.

Training for technicians and administrators will be organized in order to facilitate the application of the Land-based Sources and Dumping Protocols. The forms of training will be similar to those mentioned in the preceding paragraph.

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.

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 thus enabling the equipment used by national research centres to function properly.

As required and to the extent possible, standardized material and some equipment will be put at the disposal of national centres participating in MED POL - PHASE II to make it possible for them to participate fully in the monitoring and/or research programme.

D.1 Intercalibration and quality control programme

Identification of individual analysts responsible for each parameter listed under A.2.2, B.2 and C.2 which shall participate in the mandatory intercalibration and quality control programme.

Name	Institution	Telephone No.	Parameter	Matrix

D.2 Maintenance service

Identification of sophisticated analytical equipment which might be covered by the common maintenance service with reference to the use and localisation:

Item No.	Instrument	Make and Model	Parameters for which instrument is required	Institution No.
1.				
2.				
3.				
4.				

D.3 Technical assistance required or offered.

D.4 Training required or offered

D.5 Contribution from MED UNIT (in the form of standardized material
and/or equipment

ANNEX III

Guidelines for the Preparation of National Monitoring Programmes

Guidelines for the Preparation of National Monitoring Programmes

Introduction

Several types of monitoring will be undertaken, all contributing to the fulfilment of the principles on which MED POL II was elaborated and which have been endorsed by the Second Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against pollution and its related protocols and Intergovernmental Review Meeting of Mediterranean and Coastal States on the Action Plan, Cannes, 2 - 7 March 1981, UNEP/IG.23/11, Annex V.

- A. Monitoring of sources of pollution to provide information

on the type and amount of pollutants reaching the marine

environment from coastal sources

- 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, discharges or coastal dumping points) or

secondary (rivers and other watercourses) sources

- C. Monitoring of reference areas, as defined by article 1 of

the Convention, which are not under direct influence of

pollutants from identifiable primary or secondary sources

- D. Monitoring of the transport of pollutant to the Mediterranean

Sea through the atmosphere

Monitoring D is intended to assess the transport of pollutants mainly from diffuse, mostly land-based, sources through the atmosphere and into the sea, though the reverse process should not be neglected. It will be implemented after achieving some preparatory activities, considered for the time being as part of the research topics whose development is described in document UNEP/WG.62/4/Rev.1.

The following guidelines are intended to provide the National Co-ordinators for MED POL with common criteria on which to base the preparation and implementation of their National Monitoring Programmes. They were prepared by the Mediterranean Co-ordinating Unit (MED UNIT), in close collaboration with the various Co-operating Agencies (WHU, FAO, IAEA, IOC, WMO and UNESCO), on the basis of previous experience gained through the pilot phase of MED POL; the indications given by 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, as adopted by the Second Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols, Cannes, 2-7 March 1981 (UNEP/IG.23/11, Annex V), and taking into account the requirements of the Dumping, Emergency and Land-Based Sources Protocols. They were reviewed by the First Meeting of the Working Group on Scientific and Technical Co-operation, Athens, 28 September - 2 October 1981 (UNEP/WG.62/7). Entries in these Guidelines are marked in the same way as the corresponding entries in the Technical Annex.

MONITORING OF SOURCES OF POLLUTION TO PROVIDE INFORMATION ON
THE TYPE AND AMOUNT OF POLLUTANTS REACHING THE MARINE ENVIRONMENT
FROM COASTAL SOURCES

A.1 Selection of sources of pollutants which shall be monitored

Selection of the sources of pollution to be monitored should fulfill the following two objectives:

- Assessment of overall pollutant load reaching the Mediterranean from land-based sources and through dumping operations, to determine the long-term trends of the general pollution situation in the Mediterranean.
- Measurement of amounts of pollutants discharged through point sources into the Mediterranean to determine, as far as possible, the levels of pollution along the coasts and to evaluate the effects of the preventive measures taken.

The first objective requires that all inputs from major identifiable sources be assessed using available information relevant to the pollutant release into the environment. In particular, dumping operations (A.1.1.1), and discharges made at the coastline from land-base sources (A.1.1.2) should be identified through authorizations and special or general permits granted. The actual amounts of pollutants discharged will be estimated through the annual reports.

The second objective requires that all major identifiable sources be monitored by measuring actual pollutant concentrations. These measurements should be made primarily in the wastes dumped (A.1.2.1) in the outlets of the major urban agglomerations in coastal areas (A.1.2.2), as well as in major industrial effluents (A.1.2.3).

The main Mediterranean rivers and the urban agglomerations whose population exceeds 100,000 are listed in tables 1 and 2.

A.2 Parameters which shall be monitored

For the assessment of the total pollutant load reaching the Mediterranean Sea, all those substances listed in Annexes I and II to the Land-Based Sources and Dumping Protocols will be taken into account as required.

The parameters listed in Table 4 were identified among the substances listed in Annexes I and II of the above-mentioned protocols for monitoring of effluents (A.2.2). Priority will be given to the first three categories of parameters, (namely total mercury, total cadmium and petroleum hydrocarbons). High-molecular weight chlorinated hydrocarbons may be added to the priority parameters in the national monitoring programmes.

A.3 Working schedule

An assessment of the pollution load reaching the Mediterranean Sea will be carried out in 1982.

For the monitoring of effluents a study of the production cycle giving rise to the pollutants in the effluents in question shall be made before a definitive sampling schedule is adopted.

A.4 Institutional arrangements

The National Co-ordinators should communicate to the MED UNIT the names of the institutions and/or of the persons in charge of the assessment of the pollutant load and the monitoring of sources. A clear indication of their respective functions should be given by entering the corresponding number in the Table under A.2.2 of the Technical Annex.

A.5 Sampling and analytical techniques

Sampling and analytical techniques used in the monitoring will be based on reference methods suggested by the MED UNIT in co-operation with the Collaborating Agencies. Other methods might also be used provided they give equivalent and comparable results, and are subject to intercalibration exercises.

A.6 Data and progress reporting

An inventory of the major sources of pollution with complementary information, stating the type and amount of pollutant discharged, treatment given to the discharges, etc., should be reported to the MED UNIT by the end of 1982. An up-dating of this inventory, including all the new authorizations granted should be prepared at the end of each calendar year. (Art. 13.2 L.B.S. Protocol).

All special dumping permits granted should immediately be reported to the MED UNIT and all general dumping permits granted should be reported to the MED UNIT at the end of each calendar year. (Art. 14.2 Dumping Protocol).

Information regarding the actual amounts, nature of the wastes, or other matter dumped under each of the special and general permits, and the actual location and method of dumping should be reported to the MED UNIT at the end of each calendar year.

Data from monitoring of effluents should be reported to the MED UNIT through the National Co-ordinator (or directly, if so decided by the latter) as soon as they are available.

Reports assessing the overall amounts of pollutants discharged and/or dumped during the corresponding period by each country should be reported to the MED UNIT by National Co-ordinators before the end of each calendar year.

All forms for reporting of dumping permits and dumping operations, for direct monitoring data reporting and for overall pollutant load reporting, will be provided by the MED UNIT according to the agreed formats.

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

B.1 Selection of Areas and stations to be monitored

Monitoring of coastal marine environment requires a good knowledge of the local conditions: location and characteristics of the pollution sources, ecological characteristics, under the various prevailing oceanographic and meteorological conditions.

This monitoring should be carried out notably in:

- Areas obviously subject to larger inputs of exogenous agents (large estuaries, industrial/port areas);
- areas of special biological or hydrographic interest (bays and shellfish growing areas);
- areas apparently free of any pollution and intended to serve as control areas.

A list of the coastal areas to be monitored in each country will be prepared by the National Co-ordinator of MED POL for that country, if necessary in consultation with the MED UNIT.

The sampling stations in each area should be sufficient in number and selected taking into account dispersion processes (plumes) of effluents and water courses and the prevailing meteorological and oceanographic conditions. In estuarine areas, when choosing stations, account should be taken of the coastal lagoons often found in Mediterranean deltas. "Control" stations, where low pollutant levels are expected, should also be selected within each area to be monitored. A detailed description of the areas selected and of the location of the stations should be provided in the Table under B.1 of the Technical Annex, including a map of each area (scale 1:25,000).

B.2 Parameters and matrices which shall be monitored at each of the

areas and stations specified under B.1.

The parameters and matrices selected for mandatory monitoring are those listed in paras. 17 and 19 of Annex V to the report of the Second Meeting of Contracting Parties (Cannes, 2-7 March 1981) for an initial period of 3 years.

Table 5 indicates the parameters and matrices to be monitored, and the proposed sampling depths.

After this time, parameters and matrices to be monitored will include those listed in paras. 18 and 20 of that Annex.

The Table under section B.2 of the Technical Annex should include a list of stations, depths and parameters to be monitored with indication of institution responsible for carrying out the sampling and analysis.

B.3 Sampling schedule

Will be established by the National Co-ordinators in consultation with the MED UNIT.

B.4 Institutions which will carry out the monitoring

The National Co-ordinators should communicate to the MED UNIT the names of the institutions and/or of the persons in charge of the monitoring of coastal waters. All such institutions should participate in intercalibration exercises.

B.5 Sampling and analytical techniques

Sampling and analytical techniques used in the monitoring will be based on reference methods suggested by the MED UNIT in co-operation with the Collaborating Agencies. Other methods might also be used provided they give equivalent and comparable results, and are subject to intercalibration exercises.

B.6 Data and Progress Reporting

Data should be reported to the MED UNIT through the National Co-ordinator (or directly, if so decided by the latter) as soon as they are available. Progress reports should be submitted to the MED UNIT by the National Co-ordinators at the end of each calendar year. All the reports should be adapted to the formats and guidelines supplied by the MED UNIT.

MONITORING OF REFERENCE AREAS, AS DEFINED BY ARTICLE 1 OF THE
CONVENTION, WHICH ARE NOT UNDER DIRECT INFLUENCE OF POLLUTANTS FROM
IDENTIFIABLE PRIMARY OR SECONDARY SOURCES

C.1 Selection of areas to be monitored

Selection of the areas to be monitored should be made from among those areas identified by the MED UNIT and the Co-operating Agencies, taking into account the areas proposed for the Joint Scientific Programme of ICSEM, which were chosen on the basis of careful considerations of the hydrographic conditions of the Mediterranean Sea (see Table 7). Additional areas could also be included provided that their hydrographical conditions are well known.

C.2 Parameters and matrices to be monitored

Parameters and matrices to be monitored in the open-sea reference areas are those listed in Table 8 (para 24, Annex V, UNEP/IG.23/11).

C.3 Cruise plans

For execution of these activities, research vessels of the Mediterranean coastal States will be used. Since the cost of using oceanographic vessels is high and considerable ship-time is required for executing these activities, it is imperative that the monitoring of reference areas be well co-ordinated with on-going national, bilateral or international programmes. In particular, Spain, France, Italy, Yugoslavia and Greece have already made specific proposals.

The National Co-ordinators of the countries concerned will inform the MED UNIT of the activities planned. The MED UNIT and the Co-operating Agencies will assist in the overall co-ordination of the organization and follow-up of the activities relating to monitoring of reference areas.

Cruise organization will be arranged between interested countries and co-operating agencies and will be co-ordinated by the MED UNIT.

C.4 Participants in the cruise

It is desirable that scientists participating in the monitoring of coastal waters of the various countries concerned participate in the cruises organized for the monitoring of reference areas.

C.5 Sampling and analytical techniques

Sampling and analytical techniques used in the monitoring will be based as far as possible on reference methods provided by the MED UNIT in co-operation with the Co-operating Agencies (see section B.5 above). Other methods might also be used provided they give comparable results and are subject to intercalibration exercises.

C.6 Data and Progress Report

Data will be reported to the MED UNIT as they become available in accordance with formats developed by the MED UNIT. However, reporting of the standard physical and chemical parameters should follow the rules of the International Oceanographic Data Exchange (IODE) system.

Table 1. Main rivers discharging into the Mediterranean Sea

Egypt

- Nile

France

- Rhône

Greece

- Akhelos
- Pinios
- Aliakmon
- Axios
- Strimon
- Nestos
- Evros

Italy

- Arno
- Tevere
- Po
- Adige

Spain

- Jucar
- Ebro

Turkey

- Buyuk Menderes
- Manavgat
- Seyhan
- Ceyhan

Yugoslavia

- Neretva

Table 2. Mediterranean cities with population of 100,000 or more

	<u>Population in thousands</u>
Algeria	
- Mostaganem	100
- Oran	465
- Annaba	226
- El Wadjar	192
- Skikda	123
- Alger	1,269
Egypt	
- Alexandria	2,397
- Dumyat	103
- Port Said	310
France	
- Nice	359
- Toulon	184
- Marseille	916
Greece	
- Patras	121
- Athens	2,540
- Thessaloniki	557
Israel	
- Gaza	118
- Tel-Aviv	384
- Jaffa	116
- Haifa	225
Italy	
- Rome	2,874
- Napoli	1,221
- Genova	804
- La Spezia	122
- Pisa	104
- Livorno	178

	<u>Population in</u> <u>thousands</u>
- Sassari	112
- Cagliari	238
- Salerno	160
- Messina	263
- Palermo	666
- Bari	380
- Pescara	134
- Ancona	107
- Rimini	125
- Ravenna	138
- Venezia	365
- Trieste	270
- Siracusa	119
- Catania	399
- Reggio-Calabria	177
- Taranto	241
 Lebanon	
- Beirut	939
 Libya	
- Tarabulus	670
- Misratah	139
- Benghazi	400
 Morocco	
- Nador	501
- Al-Hoceima	257
 Spain	
- Ceuta	136
- Melilla	134
- Malaga	400
- Almeria	127
- Cartagena	158
- Valencia	714
- Castellon de la Plana	110
- Hospitalet de Llobregat	242
- Barcelona	1,745
- Badalona	202
- Alicante	218
- Palma de Mallorca	262

	<u>Population in</u> <u>thousands</u>
Syria	
- Latakia	200
Tunisia	
- Grand Tunis	874
- Sfax	171
Turkey	
- Alexandretta	103
- Hatay	124
- Mersin	152
- Antalya	140
- Izmir	858
Yugoslavia	
- Rijeka	132
- Split	184

Table 3. (Deleted)

Table 4. Parameters to be determined in effluents

Priority parameters

Total mercury (Hg)

Total cadmium (Cd)

Petroleum hydrocarbons (PH)

Other parameters (not in order of priority)

High-molecular weight chlorinated hydrocarbons (HH)

Biochemical oxygen demand (BOD₅)

Chemical oxygen demand (COD)

Total suspended solids (TSS)

Total phosphorus (P)

Total nitrogen (N)

Faecal coliforms (FC)

Detergents (anionic) (DEI)

Phenols (index) (PHE)

Total lead (Pb)

Total chromium (Cr)

Total zinc (Zn)

Selected radionuclides (RAD)

Table 5. Parameters and matrices selected for monitoring of coastal waters including estuaries

<u>Matrix</u>	<u>Depth</u>	<u>Parameter</u>						
<u>Estuarine water (E)</u>	- corresponding to Salinity minimum Salinity maximum	(Basic oceanographic and (meteorological observations for (the area (T,S,O, current, wave (state, wind. (Faecal coliforms (FC) (Total mercury (Hg) (Total cadmium (Cd) (High-molecular weight halogenated (hydrocarbons (HH) (Total phosphorus (P) (Total nitrogen (N) (Biochemical oxygen demand (BOD ₅)- (Chemical oxygen demand (COD)						
		<u>Coastal water (C)</u>	- surface film - 0-20 cm - 1 m - 2 - 3 m - stand. depths	(Basic oceanographic and (meteorological observations for (the area (T,S,O, current, wave (state, wind. (Oil slick observations (OS) (FC (Tar ball collections (TR) (Petroleum hydrocarbons dissolved/ (dispersed in water (PH) (FC (Standard physical and chemical (parameters (SP&C)(Temperature, (Salinity, etc.)				
				<u>Suspended matter (SM)</u> (in estuaries)	- corresponding to Salinity minimum Salinity maximum	(Hg (Cd (HH (P (N		
						<u>Sediments (SD)</u>	- Top layer	(Hg (HH (PH
								<u>Sea-shore (SS)</u>

BiotaParameter

- Mytilus galloprovincialis (MG), or
Mytilus edulis (ME), or
Perna perna (PE), or
Donax trunculus (DI)
 - (Hg
 - (Cd
 - (HH
 - (

M. Edulis, P. perna or D. trunculus can only be monitored as alternative species if Mytilus galloprovincialis does not occur in the area.

- Mullus barbatus (MB), or
Mullus surmuletus (MS), or
Upeneus molluccensis (UM)
 - (Hg
 - (Cd
 - (HH

M. surmuletus or U. molluccensis can only be monitored as alternative species if M. barbatus does not occur in the area.

- Thunnus thynnus (TT), or
Thunnus alalunga (TA), or
Xiphias gladius (XG)
 - (Hg
 - (Cd
 - (HH

- Sardina pilchardus (SP)
 - (Hg
 - (Cd
 - (HH
- Other clupeids should only be monitored as alternative species if S. pilchardus does not occur in the area.

- Parapenaeus longirostris (PL), or
Nephrops norvegicus (NN), or
Penaeus kerathurus (PK)
 - (Hg
 - (Cd
 - (HH

N. norvegicus or P. kerathurus can only be monitored as alternative species if Parapenaeus longirostris does not occur in the area.

In order to allow the comparison of monitoring results, every effort should be made, in consultation with the MED UNIT, to analyze also the respective alternative species if they occur together with the mandatory species in the same area.

If, in an area to be monitored, none of the species listed under each category occur, the MED UNIT should be consulted.

- All edible bivalves (EB)
 - FC

Table 6. (Deleted)

Table 7. Reference areas (open-sea) proposed for monitoring

Name of areas

Strait areas

Strait of Gibraltar
Sardinian Channel
Sicilian Channel
Straight of Otranto
Crete west
Crete east

Off-estuary areas

Ebro
Rhône
Po
Nile

Gyre-centre areas

Ligurian Sea
Western Basin
Tyrrhenian Sea
Ionian Sea N
Ionian Sea S
Levantine Basin W
Levantine Basin E

Table 8 Parameters and matrices selected for monitoring of reference areas

<u>Matrix</u>	<u>Depth</u>	<u>Parameter</u>
<u>Water (SW)</u>		(Basic oceanographic and (meteorological observations (for the area (T,S,O, current (wave state, wind
	- surface film	(oil slick observations (OS)
	- 0 - 20 cm	(tar ball collections (TR)
	- 1 m	(Petroleum hydrocarbons (dissolved/dispersed in (water (PH)
	- stand. depths	(standard physical and chemical (parameters (SP&C)(Temperature, (Salinity, etc.)
<u>Sediments (SD)</u>	- surface layer	(Hg (PH (HH
<u>Biota</u>		
	Whenever possible, Table 5 should be followed in selecting the species to be monitored	(Hg (Cd (HH

ANNEX IV

The following is the text of Annex V to the report of the Second Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against pollution and its related protocols, Cannes, 2 - 7 March 1981 (UNEP/IG.23/11).

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 Sea (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 83 national research centres designated by 16 Mediterranean States, and the EEC, as participants in co-operative networks and on the input of eight United Nations organizations (ECE, UNIDO, FAO, UNESCO, IOC of UNESCO, WHO, WMO, IAEA), IUCN and ICSEM. The over-all 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 at Barcelona, 16 February 1976; 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 at 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 at 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 supported the MED POL - PHASE I. Subsequently, it was formally approved by the Second Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols and the Intergovernmental Review Meeting of Mediterranean coastal States on the Action Plan held at Cannes, 2-7 March 1981.

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 possible 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 United Nations system. The International Computing Centre (ICC) at 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 over-all 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 the relevant international organizations, under the responsibility of the Co-ordinating Unit.
- (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 in co-operation with the international organizations;

The Working Group for Scientific and Technical Co-operation;

Experts, selected by the Co-ordinating Unit in consultation with the international organizations. These experts will act 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 fulfilment 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 annexes I and II of the Land-Based Sources Protocol (paragraph 12 (a)).
- (b) Pollutants listed in annexes I and 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 over-all 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 over-all 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 the 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;

Faecal 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 three 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;

Faecal 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;

Faecal 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 three 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 upon jointly by the 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 annex I and annex II to 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 faecal 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 co-ordinators, (or directly, if so decided by the latter) 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 the relevant international organizations. On this level, using the computer facilities of the International Computing Center at 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. The Co-ordinating Unit, in consultation with the specialized organizations, may convene groups of experts, either periodically or on an ad hoc basis, to assist in the analysis, integration and interpretation of data, after consideration is given to the possibility of convening meetings of the Working Group for Scientific and Technical Co-operation.

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 possible 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 at 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 thus enabling the equipment used by national research centres to function properly.
48. As required and to the extent possible, standardized material and some equipment will be put at the disposal of national centres participating in MED POL - PHASE II to make it possible for them to participate fully in the monitoring and/or 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. The over-all co-ordination of MED POL - PHASE II will be ensured by UNEP through the Co-ordinating Unit for the Mediterranean Action Plan, with the assistance of the international organizations. Such co-ordination shall be achieved as economically as possible.

51. 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.
52. 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 carrying out these programmes on a global level, under the over-all guidance of the Mediterranean Action Plan Co-ordinating Unit.
53. 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

54. 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.

APPENDIX

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/ICEM 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/WHO/UNEP and IOC/UNEP Pilot Projects, (Barcelona, 23-27 May 1977). IOC-WHO-UNEP/MED-MRM/3. UNESCO 1977.

Guidelines for the Implementation of Pilot Projects MED I and MED VI. Supplements 1 and 3 to IOC-WHO-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.

Coastal Water Pollution Control. Report of a joint WHO/UNEP Workshop (Athens, 27 June - 1 July 1977). WHO 1977.

Manual of Methods in Aquatic Environment Research. Part 4: Bases for Selected Biological Tests to Evaluate Marine Pollution, FAO Fisheries Technical Paper No. 164. FAO 1977.

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.4. UNEP 1978.

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

Coastal Quality Monitoring of Recreational and Shellfish Areas (MED VII). Report of a Workshop convened jointly 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).

