


MEDITERRANEAN ACTION PLAN  
PRIORITY ACTIONS PROGRAMME

---

UNITED NATIONS ENVIRONMENT PROGRAMME



WORLD HEALTH ORGANIZATION

GUIDELINES FOR MONITORING EFFLUENTS FROM  
SELECTED SUBMARINE OUTFALLS AND AFFECTED COASTAL MARINE AREAS

1. Background

1.1 Article 7.1 (a) of the Protocol for the protection of the Mediterranean Sea against pollution from land-based sources binds the Contracting Parties to progressively formulate and adopt, in cooperation with the competent international organizations, common guidelines and, as appropriate, standards or criteria dealing with the length, depth and position of pipelines for coastal outfalls, taking into account, in particular, the methods used for pre-treatment of effluents.

1.2 As part of the preparations and studies towards the eventual implementation of this part of the protocol through the development of appropriate guidelines, the technical effectiveness of a number of selected outfall structures is being studied by monitoring the main physical, chemical and microbiological parameters at the discharge point of the effluent and, as appropriate, in the surrounding area. This study is being performed within the joint framework of the Long-term Programme for Pollution Monitoring and Research in the Mediterranean Sea (MED POL Phase II) and the Priority Actions Programme (PAP) activity on solid and liquid waste management.

2. Duration of study

2.1 It is expected that the study will be conducted over a period of one year, starting between 1 July and 1 September 1986.

3. Pre-monitoring data

3.1 Prior to commencing the monitoring programme, the following area assessment should be made, to determine the impact of pollution on the various uses of the coastal waters in the vicinity of the outfall:

- 3.1.1 Categories of land and sea use within the area, including use of beaches and recreational waters
- 3.1.2 Shellfish-growing areas, indicating site and type of shellfish; also, catch (tonnage per year) in the case of commercial culture areas
- 3.1.3 Population density in: (a) general area, and (b) area actually served by outfall structure
- 3.1.4 Identification of rivers and streams, including location, flow and individual monthly discharge into the sea
- 3.1.5 Type of sewerage system connected to the outfall.
- 3.1.6 Identification of dumping sites, both on land and at sea, in the area, indicating whether for industrial and/or domestic waste, and capacity or quantity per year
- 3.1.7 Coastline: sand, rock, gravel, cliffs; also, whether shallow or deep
- 3.1.8 Winds: drawing up of seasonal wind-roses

3.1.9 Annual precipitation in tabular form by monthly averages

3.1.10 Average monthly air temperatures

3.1.11 Currents: description and seasonal fluctuations

3.1.12 Sea temperature and salinity

3.1.13 Depth contours from nautical charts

3.2 In addition, all possible data regarding the outfall structure itself, will have to be noted, including:

3.2.1 Exact location, including those of diffusers

3.2.2 Length and diameter

3.2.3 Depth and position with regard to sea bottom

3.2.4 Construction material and design, including protective methods used, (e.g. bedding, ballast, etc.)

3.2.5 Capacity, and flow patterns

3.2.6 Maintenance schedules observed, and state of repair

3.2.7 Industries (give type) discharging into sewage network served by outfall

3.2.8 Pre-treatment, if any, prior to discharge

3.2.9 Description of monitoring programmes, if any

3.3 All other data concerning the quality of receiving waters, particularly pollution levels, would also be valuable.

3.4 The data obtained from 3.1, 3.2 and 3.3 above will have to be recorded on fact sheets and/or detailed maps, as appropriate.

#### 4. Sampling

##### 4.1 Sampling procedures

The sampling procedures to be used should, to the extent possible, be those described in the reference methods for determination of individual parameters developed for the MED POL programme (listed in Annex 1). Otherwise, the APHA standard methods for the examination of water and wastewater (latest edition) should be used.

Sampling should be performed in a systematic manner to reduce variation between individual results. Therefore, as many factors as possible should be kept constant. These include (a) the location and depth of individual sampling points (b) the actual period of sampling, and (c) the actual sampling method.

The actual sampling period (i.e. time of day) in the same sampling point should not vary by more than 2 to 3 hours. The actual optimum sampling time would depend on a number of factors, including correlation with the effects of the intermittent-flow sources (i.e. the sewage outlet), avoiding peaks of sewage discharge and recreational activities.

If possible, in sampling the effluent itself, sewage flow estimates should be made, either by the use of existing calibration curves for already-installed pumps (e.g. delivery test documents) or by tracer methodologies. The flow should be determined at suitable intervals to account for fluctuations.

#### 4.2 Sampling point locations

In sampling the effluent itself, samples should be taken at appropriate points on land where easy access allows representative samples to be taken.

In water sampling, points should be selected between the outfall and the coastline, including the coastline itself on both sides of the outfall. The length of coastline to be monitored will vary according to local conditions. At least one point should be at the outfall, and two on the coastline, not less than 3 metres out and at a depth of not less than 1 metre. For microbiological parameters in water, ten sampling points should be selected: four around the mouth of the outfall, one on each side of the outfall at points approximately half-way between the mouth of the outfall and the coastline, and two on each side of the outfall, at the coastline itself (Fig. 1). Points near the outfall mouth, and mid-way between the outfall mouth and the coastline should be sampled at two levels (surface and bottom). If possible, samples at intermediate level should also be taken.

For sediment monitoring, 1 point in the vicinity of the outfall where sediment is shown to accumulate should be sampled, as well as 1 point located between the two sampling points for water on the coastline.

#### 4.3 Sampling frequency

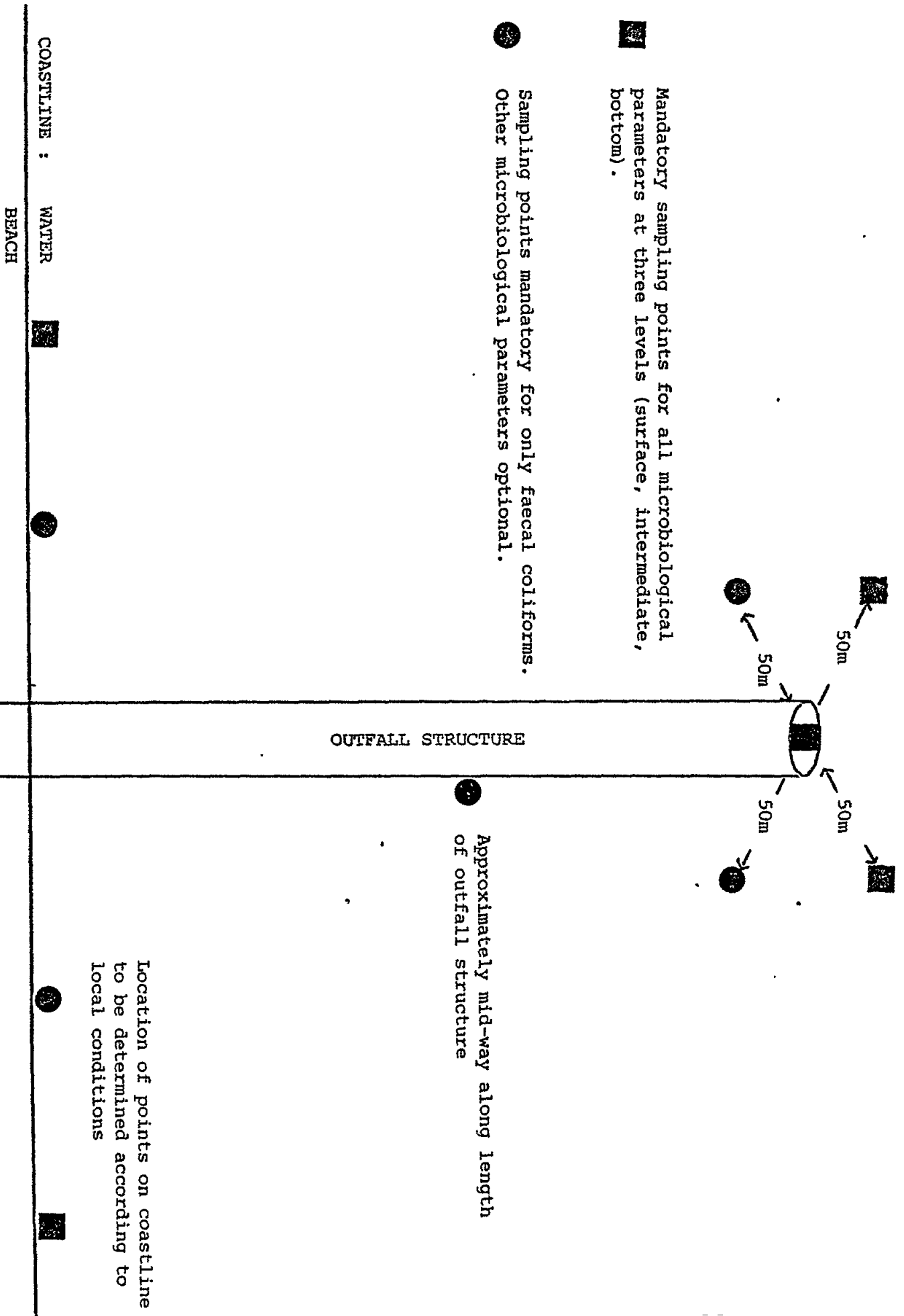
Sampling of effluents should be performed once a month. Sampling of the surrounding waters should be performed at 1-month intervals during the period of use of the coastline, otherwise at 3-month intervals. Sampling of sediments should be performed once during the course of the study, at the end of the season, (i.e. September/October). Particular days of sampling should be adjusted according to meteorological and hydrographic conditions, avoiding unusual conditions (storms, etc.). Sampling of benthos for heavy metals should be performed twice during the course of the project; for other parameters, the same as for water.

### 5. Monitoring parameters

5.1 Two types of parameters/observations will have to be determined or collected:

5.1.1 General observations of selected local meteorological and hydrographic conditions relevant at the time of sampling

Figure 1: Stations (sampling points) for microbiological parameters



5.1.2 Determination of selected physical and chemical parameters and/or microbiological counts for particular locations selected as sampling points (including as appropriate effluents, seawater, sediments and benthic organisms)

5.2 The following parameters of a general nature should be observed on a continuous basis, preferably at an existing weather station:

5.2.1 Wind: continuous records of direction and velocity

5.2.2 Currents: current pattern from local records

5.3 Parameters to be measured for effluents

5.3.1 General effluent quality

- (a) flow measurements
- (b) suspended solids
- (c) turbidity
- (d) pH
- (e) grease and oil (hexane extractable)
- (f) BOD
- (g) COD
- (h) total nitrogen
- (i) phosphorus

5.3.2 Heavy metals

Obligatory parameters

- (a) mercury
- (b) cadmium
- (c) lead

Optional parameters

- (d) organotin compounds
- (e) zinc
- (f) copper
- (g) nickel
- (h) chromium
- (i) selenium
- (j) arsenic

5.3.3 Organic compounds

- (a) anionic detergents

5.3.4 Radioactive compounds (optional)

- (a) total detectable radioactivity

5.3.5 Micro-organisms

Obligatory parameters

- (a) faecal coliforms
- (b) faecal streptococci
- (c) salmonellas

Optional parameters

- (d) vibrio parahaemolyticus
- (e) shigella
- (f) yersinia
- (g) enteric viruses
- (h) staphylococcus aureus

5.4 Parameters to be determined in sediments

5.4.1 Heavy metals, organic compounds and radioactive compounds as in 5.3.2, 5.3.3 and 5.3.4 respectively

5.4.2 Micro-organisms

Obligatory parameters

- (a) faecal coliforms
- (b) salmonellas

Optional parameters

- (c) vibrio parahaemolyticus
- (d) enteric viruses

5.5 Parameters to be determined in seawater

Obligatory parameters

- (a) faecal coliforms
- (b) faecal streptococci
- (c) salmonellas
- (d) total nitrogen
- (e) phosphorus
- (f) temperature
- (g) salinity

Optional parameters

- (h) enteric viruses
- (i) any other parameter listed in 5.3 above in selected sampling points, if indicated by data obtained from effluent monitoring

## 5.6 Parameters to be determined in marine benthos

The selection of particular benthic organisms to be sampled and analyzed will depend on the specific fauna and flora of each particular locality. These should include at least one or two species of edible lamellibranch molluscs and, optionally, one species of alga (e.g. a sessile phaeophyte), and one angiosperm (e.g. Posidonia). The following parameters should be monitored, wherever appropriate:

- 5.6.1 heavy metals: obligatory - mercury, cadmium and lead  
optional - any others in 5.3.2 above
- 5.6.2 faecal coliforms (in edible molluscs)
- 5.6.3 faecal streptococci (in edible molluscs)
- 5.6.4 salmonellae (in edible molluscs)
- 5.6.5 enteric viruses (in edible molluscs) (optional)
- 5.6.6 any other parameter indicated by results obtained from other matrices

## 6. Determination of parameters

The analytical procedures used should, to the extent possible, be those described in the reference methods for determination of individual parameters developed for the MED POL programme (listed in Annex 1), otherwise the APHA standard methods.

## 7. Reporting of results

Results should be reported in the appropriate MED POL format (examples are provided in Annex 2).



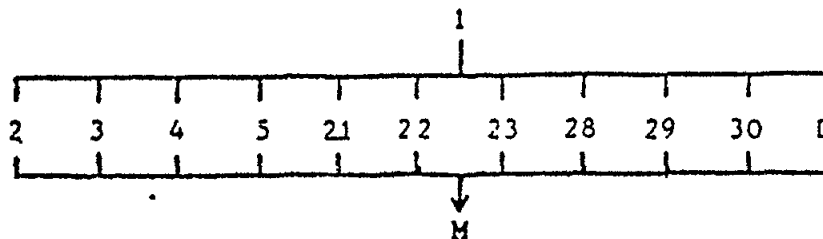
ANNEX I

STATUS OF REFERENCE METHODS FOR MARINE POLLUTION STUDIES

January 1986

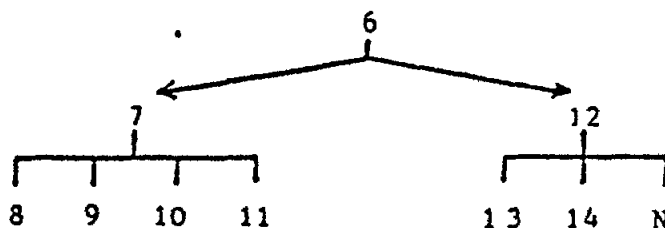
A. Sanitary quality of coastal recreational and shellfish-growing waters

No. 1	UNEP/WHO: Guidelines for monitoring the quality of coastal recreational and shellfish-growing waters.	draft(E) 09.05.84
No. 2	UNEP/WHO: Determination of total coliforms in sea water by the membrane filtration culture method.	Rev.1(E) 31.08.83 Rev.1(F) 31.10.83
No. 3	UNEP/WHO: Determination of faecal coliforms in sea water by the membrane filtration culture method.	Rev.1(E) 31.08.83 Rev.1(F) 31.10.83
No. 4	UNEP/WHO: Determination of faecal streptococci in sea water by the membrane filtration culture method	Rev.1(E) 31.08.83 Rev.1(F) 31.10.83
No. 5	UNEP/WHO: Determination of faecal coliforms in bivalves by multiple test tube method.	Rev.1(E) 31.08.83 Rev.1(F) 31.10.83
No. 21	UNEP/WHO/IAEA: Determination of total coliforms in sea water by multiple test tube (MPN) method.	draft(E) 19.07.85
No. 22	UNEP/WHO/IAEA: Determination of faecal coliforms in sea water by multiple test tube (MPN) method.	draft(E) 19.07.85
No. 23	UNEP/WHO/IAEA: Determination of faecal streptococci in sea water by multiple test tube (MPN) method.	draft(E) 19.07.85
No. 28	UNEP/WHO/IAEA: Determination of staphylococcus aureus in sea water and sewage by the membrane filtration culture method.	in preparation
No. 29	UNEP/WHO/IAEA: Determination of pseudomonas aeruginosa in sea-water and sewage by the membrane filtration culture method.	in preparation
No. 30	UNEP/WHO/IAEA: Isolation/enumeration of salmonella from sea water and sewage.	in preparation
D	UNEP/WHO/IAEA: Determination of faecal coliforms in estuarine waters, suspended matter and sediments.	in preparation
M	UNEP/WHO/IAEA: Statistical methods for the evaluation of results from monitoring the quality of coastal recreational and shellfish-growing waters.	in preparation



B Chemical contaminants in marine organisms

- |        |  |                   |
|--------|--|-------------------|
| No. 6  | UNEP/FAO/IAEA: Guidelines for monitoring chemical contaminants in marine organisms.  | in preparation    |
| No. 7  | UNEP/FAO/IOC/IAEA/: Sampling of selected marine organisms and sample preparation for trace metal analysis.   | Rev.2(E) 12.11.84 |
| No. 8  | UNEP/FAO/IOC/IAEA/: Determination of total mercury in selected marine organisms by cold vapour atomic absorption spectrophotometry.                      | Rev.1(E) 12.11.84 |
| No. 9  | UNEP/FAO/IAEA: Determination of total arsenic in selected marine organisms by hydride generation atomic absorption spectro-photometry.                   | draft(E) 22.04.85 |
| No. 10 | UNEP/FAO/IAEA: Determination of total selenium in selected marine organisms by hydride generation atomic absorption spectrophotometry.                   | (E) 12.11.84      |
| No. 11 | UNEP/FAO/IOC/IAEA/: Determination of total cadmium, zinc, lead and copper in selected marine organisms by flameless atomic absorption spectrophotometry. | Rev.1(E) 12.11.84 |
| No. 12 | UNEP/FAO/IAEA: Sampling of selected marine organisms and sample preparation for the analysis of chlorinated hydrocarbons.                                | Rev.1(E) 12.11.84 |
| No. 13 | UNEP/FAO/IAEA: Determination of methyl-mercury in selected marine organisms by gas chromatography.   | (E) 12.11.84      |
| No. 14 | UNEP/FAO/IOC/IAEA: Determination of DDTs and PCBs in selected marine organisms by packed column gas chromatography.                                      | in preparation    |
| No. N  | UNEP/FAO/IOC/IAEA: Determination of DDTs and PCBs in selected marine organisms by capillary column gas chromatography.                                   | in preparation    |



C. Chemical contaminants in sea water

- No. 16 UNEP/IAEA: Determination of DDTs, PCBs, PCCs and other hydrocarbons in sea water by gas chromatography. draft(E) 21.09.82
- No. 18 UNEP/IOC: Determination of total dissolved cadmium in sea water by differential pulse anodic stripping voltammetry. draft(E) 16.09.83
- B UNEP/IOC/IAEA: Monitoring of petroleum hydrocarbons in sea water. in preparation

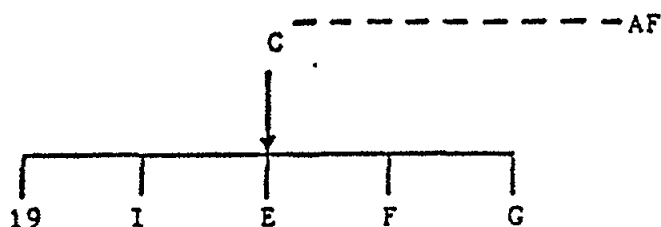
D. Chemical contaminants in marine sediments and suspended matter

- No. 17 UNEP/IAEA: Determination of DDTs, PCBs, PCCs and other hydrocarbons in marine sediments by gas-liquid chromatography. draft(E) 22.09.82
- No. 20 UNEP/IOC/IAEA: Monitoring of petroleum hydrocarbons in sediments. in preparation
- No. 26 UNEP/IAEA: Determination of total mercury in marine sediments and suspended solids by cold vapour atomic absorption spectrophotometry. draft(E) 25.03.85
- No. 27 UNEP/IAEA: Determination of total cadmium in marine sediments by flameless atomic absorption spectrophotometry. draft(E) 25.03.85
- No. 31 UNEP/IAEA: Determination of total chromium in marine sediments by flameless atomic absorption spectrophotometry. draft(E) 17.07.85
- No. 32 UNEP/IAEA: Determination of total cobalt in marine sediments by flameless atomic absorption spectrophotometry. draft(E) 17.07.85
- No. 33 UNEP/IAEA: Determination of total copper in marine sediments by flameless atomic absorption spectrophotometry. draft(E) 17.07.85
- No. 34 UNEP/IAEA: Determination of total lead in marine sediments by flameless atomic absorption spectrophotometry. draft(E) 17.07.85
- No. 35 UNEP/IAEA: Determination of total nickel in marine sediments by flameless atomic absorption spectrophotometry. draft(E) 17.07.85
- No. 36 UNEP/IAEA: Determination of total vanadium in marine sediments by flameless atomic absorption spectrophotometry. draft(E) 17.07.85
- No. 37 UNEP/IAEA: Determination of total iron in marine sediments by flame atomic absorption spectrophotometry. in preparation

- No. 38 UNEP/IAEA: Determination of total manganese in marine sediments by flame atomic absorption spectrophotometry. in preparation
- No. 38 UNEP/IAEA: Determination of total zinc in marine sediments by flame atomic absorption spectrophotometry. in preparation

E. Chemical contaminants in estuarine waters and suspended matter

- No. 19 UNEP/IOC/IAEA: Determination of total mercury in estuarine waters and suspended sediment by cold vapour atomic absorption spectrophotometry. draft(E) 25.03.85
- C UNEP/IAEA: Guidelines for monitoring of estuarine waters and suspended matter. in preparation
- E UNEP/WHO/IAEA: Determination of phosphorus in suspended matter and sediments. in preparation
- F UNEP/WHO/IAEA: Determination of nitrogen in suspended matter and sediments. in preparation
- G UNEP/WHO/IAEA: Determination of BOD<sub>5</sub> and COD in estuarine waters. in preparation
- I UNEP/IOC/IAEA: Determination of total cadmium in estuarine waters and suspended matter. in preparation
- AF UNEP/IOC/IAEA: Guidelines for the determination of riverine inputs of contaminants to estuaries. in preparation



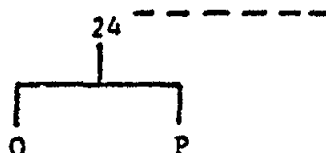
F. Chemical contaminants on beaches

- No. 15 UNEP/IOC/IAEA: Monitoring of tar on marine beaches. draft(E) 25.03.85

G. Atmospheric chemical contaminants

- No. 24 UNEP/WMO/IAEA: Sampling of aerosols and wet precipitation for analysis of chemical pollutants. draft(E) 12.04.85

- O UNEP/IAEA: Determination of selected trace metals in aerosols and in wet precipitation. in preparation
- P UNEP/IAEA: Determination of halogenated hydrocarbons in aerosols and in wet precipitation. in preparation
- Q UNEP/WMO/IAEA: Sampling of dry deposition. in preparation



H. Effects on marine organisms and ecosystems

- No. 25 SPC/UNEP: Coral reef monitoring handbook. (E) 27.08.84
- A UNEP: Sampling and identification of common Mediterranean Scyphomedusae and evaluation of their occurrence. in preparation
- H UNEP/FAO/IAEA: Acute biological toxicity tests. in preparation
- J UNEP/FAO/IAEA: Biological non-acute toxicity tests. in preparation

I. Standard physical, chemical and meteorological observations

- K UNEP/IOC/IAEA: Determination of basic oceanographic and meteorological conditions. in preparation
- L UNEP/IOC/IAEA: Determination of standard physical and chemical parameters. in preparation

J. Miscellaneous methods

- AD UNEP/WHO/IAEA: Determination of methylmercury, total mercury and selenium in human hair. in preparation

ANNEX II

LOG FORMS FOR REPORTING DATA ON MONITORING

LOG FORM B1 for reporting data on monitoring of MICROBIAL POLLUTION  
in SEA WATER

---







Explanatory notes for completing the log form B1 for  
reporting data on Microbial Pollution in Sea Water

This form is meant to provide results of determinations of microbial pollutants in seawater sampled and analysed according to Reference Methods Nos 1, 2, 3 and 4. The list of reference methods for marine studies is in Annex I. If different methods are followed, a full description of these methods or a proper bibliographical reference should be made available to the MED Unit.

For the purposes of this form, a sampling point means a specific location, including a specific depth. Samples taken at the same sampling point, but at different depths are considered to represent different sampling points.

One line should be used to report the result of each analysis or the arithmetic mean and standard deviation of analyses of replicate samples from the same sampling point. Averaging of results from various sampling points should not be reported in this form.

If more than one line is used for a single station, the SAMPLING INFORMATION and the BASIC OCEANOGRAPHIC AND METEOROLOGICAL INFORMATION should be reported only on the first line of that station. If more than one bacterial indicator is reported for the same sampling point SAMPLING DEPTH, TEMPERATURE, SALINITY and OXYGEN may be written only in the first line of that sampling point. Where more than one bacterial indicator is determined, the bacterial indicator name, in the proper code, should be specified in each line.

The following specific instructions should be used to fill the forms :

- ALWAYS utilize first the form specified as page one.
- Place your READY MADE STICKER sent from the Med Unit on page one.
- ALWAYS use capital letters when filling in the forms.
- Specify the reference to the relevant analytical method used on the first page where indicated as REFERENCE TO ANALYTICAL METHOD USED.
- When the data entry section of the first page is full then always use ordinary forms (the ones without stickers) and write down the appropriate page number on the top left-hand side of the form.
- When all the data are reported, write down the total number of forms used (i.e. total number of pages) on the top left-hand side of the first page and staple together all the forms used for the same set of stations.

SAMPLING INFORMATION (see Reference Method No.1, Annex I )

**STATION NUMBER:** Use the code number for the station as defined in your monitoring programme.

**SAMPLING DATE:** Enter the date on which the sample was collected, e.g. 1 July 1983 as 01 07 83.

**SAMPLING TIME:** Enter the time at which the sample was collected, e.g. 2.15 pm as 14 15.

**SAMPLING LOCATION:** Enter the geographic coordinates of the location where the sample was collected, in degrees and in minutes (enter E or W in the E/W column) e.g. 40 15 15 30 E.

**DISTANCE FROM SHORE:** Enter distance from shore in metres.

**BOTTOM DEPTH:** Enter depth of water in metres to nearest 0.5 metre, i.e. 2.5 or 3.0.

BACTERIOLOGICAL AND COMPLEMENTARY INFORMATION

**SAMPLING DEPTH:** Enter depth at which sample is taken to nearest 0.1 metre.

**BACTERIAL INDICATOR:** Enter the indicator's code name as follows:  
Total coliforms: TC  
Faecal coliforms: FC  
Faecal streptococci: FS  
For other indicators and pathogens, see Annex B to Reference Method No.1.

**BACTERIAL COUNT:** Enter the result as no. of bacteria (colonies) per 100 ml.

**TEMPERATURE:** Enter in degrees centigrade.

**SALINITY:** Enter in parts per thousand.

**OXYGEN:** Enter in ml dissolved oxygen per litre.

BASIC OCEANOGRAPHIC AND METEOROLOGICAL OBSERVATIONS

WAVE HEIGHT: Enter height of waves in metres to nearest 0.5 metre, i.e. 2.5 or 3.0.

WIND DIRECTION: Enter the direction from which the wind blows, in degrees.

WIND SPEED: Enter in metres per second.

SURFACE CURRENT  
DIRECTION: Enter the direction towards which the current goes, in degrees.

SURFACE CURRENT  
SPEED: Enter in cm per second.

COMMENTS : Use this section to enter any relevant information.

Make sure that any comment is entered against the appropriate indicator, i.e. in the same line. If comments take up more than one line, commence any further data on other stations or indicators in line following end of comment.

Long comments may be written on the back of the form with proper reference to the appropriate line.

LOG FORM B2 for reporting data on monitoring of HEAVY METALS  
in MARINE ORGANISMS





Explanatory notes for completing the log form B2 for  
reporting data on Heavy Metals in Marine Organisms

This form is meant to provide results of analyses of heavy metals in marine organisms sampled according to Reference Method n° 7, Rev 2 and analysed according to Reference Methods n° 8, 9, 10, 11 or 13. List of reference methods for marine pollution studies is in Annex I. If different methods are followed, a full description of these methods or a proper bibliographic reference should be made available to the MED UNIT.

Each line should be used to report the result of a single analysis, or of the arithmetic mean and standard deviation of replicate analyses, carried out on one "specimen sample". Averaging of results from various "specimen samples" should not be reported in this form.

If several elements (heavy metals) or tissues are analysed on one "specimen sample" the same SAMPLE CODE should be given in all the corresponding lines. When entering the various analytical results of the corresponding sample, the SAMPLING INFORMATION and the BIOLOGICAL INFORMATION should be specified only once when entering the first analytical result. If several tissues are analysed in a "specimen sample" the TISSUE name should be specified in each line.

The following specific instructions should be used to fill the forms :

- ALWAYS utilize first the form specified as page one.
- Place your READY MADE STICKER sent from the Med Unit on page one.
- ALWAYS use capital letters when filling in the forms.
- Always make reference to the relevant analytical method used on the first page where indicated as REFERENCE TO ANALYTICAL METHOD USED.
- When the data entry section of the first page is full then always use ordinary forms (the ones without stickers) and write down the appropriate page number on the top left-hand side of the form.
- When all the data are reported, write down the total number of forms used (i.e. total number of pages) on the top left-hand side of the first page and staple together all the forms used for the same set of samples.



SAMPLING INFORMATION : (see Reference Method n° 7.Rev 2, Annex I )

**SAMPLE CODE** For specimen sample code use any numbering sequence according to your own option e.g. 123 or PE12.

**STATION NUMBER** Enter the name or station number as it appears in your Monitoring Programme. In this case the sampling location column can be left blank. If this station is not defined in your Monitoring Programme, use the sampling location column to define it.

**SAMPLING DATE** Enter the date on which the sample was collected, e.g. 1 July 1983 as 01 07 83.

**SAMPLING LOCATION** Enter the geographic co-ordinates of the location where the sample was collected, in degrees and minutes (enter E or W in the E/W column) e.g. 40 15 15 30 E. If precise coordinates are not known, try to approximate to the nearest degree and leave minutes blank e.g. 40 \_\_\_ 15 \_\_\_ E.

Sampling at fish markets should only take place for monitoring purposes if the area in which the organisms were caught is known.

BIOLOGICAL INFORMATION

**SPECIES NAME** Enter the scientific name of the species sampled e.g. MULLUS BARBATUS.

**N<sub>s</sub>** Enter the number of specimens in the sample if the sample is composite e.g. 12, otherwise enter 1.

**LENGTH**

**Units** Enter the units used e.g. CM.

**Av. Lgth** Enter the arithmetic mean of the lengths of the various specimens included in the sample if the sample is composite, otherwise, enter the actual length of the individual specimen e.g. 9.00.

**St. dev.** Enter the standard deviation calculated for the length only if the sample is composite e.g. 0.12.

WEIGHT

Units Enter the units used e.g. KG.

Av.  
wght.

Enter the arithmetic mean of the weights of the various specimens included in the sample if the sample is composite, otherwise enter the actual weight of the individual specimen e.g. 5.00.

St. dev.

Enter the standard deviation calculated for the weight only if the sample is composite e.g. 0.125.

SEX

Enter M-Male, F-Female, I-Indeterminate.

AGE

Enter estimated or average age in years e.g. 3 or ND if not determined.

TISSUE

Enter the name of the tissue analysed e.g. LIVER (refer to the list of the tissue names attached).

ANALYTICAL INFORMATION

DW/FW

Enter the ratio of Dry Weight to Fresh Weight in percentage e.g. 21.5 .

ELEMENT

Enter the symbol used for the element analysed e.g. CD for total cadmium, MEHG for methyl mercury, and IHG for inorganic mercury.

N<sub>a</sub>

Enter the number of replicate analyses of the element analysed carried out on the same sample e.g. 5.

CONC.

Enter the arithmetic mean of the concentrations obtained for each element analysed if several replicate analyses have been carried out, otherwise enter the single value obtained, expressed with respect to fresh weight in (µg/kg FW) e.g. 10.03.

St. dev.

Enter the standard deviation calculated for the concentrations reported, only if replicate analyses have been carried out e.g. 0.25.

COMMENTS

Use this section to enter:

- extraction and/or digestion procedure.
- any complementary information e.g. on the way the sample has been stored.

Further comments may be written on the back of the form with proper reference to the relevant line.

LIST OF TISSUE NAMES

The recommended tissues for analysis are the edible portions of the organisms.

For:

CRUSTACEANS

Abdomen

MOLLUSCS

Soft part

FISH

Fillet ( For bigger fish, differentiations can be made between the various fillets.)

Other tissues may be used for analysis in some organisms.

Whole body  
Soft Part  
Liver  
Kidney  
Ovary  
Testes  
Gonads  
Fillet (general)  
White  
Brown  
Pectoral  
Adductor  
Foot (molluscs)  
Pincer (crustaceans)  
Abdomen (crustaceans)  
Tentacles (cephalopods)  
Arms  
Carapace  
Shell  
Others

LOG FORM B3 for reporting data on monitoring of HALOGENATED HYDROCARBONS  
in MARINE ORGANISMS

LONG TERM PROGRAMME FOR POLLUTION

MONITORING AND RESEARCH IN THE MEDITERRANEAN SEA

(MED POL-PHASE II)



UNITED NATIONS ENVIRONMENT PROGRAMME

Co-ordinating Unit  
for the Mediterranean Action Plan



Place for sticker

LOG FORM B3 for reporting data on monitoring of HALOGENATED HYDROCARBONS in MARINE ORGANISMS

SAMPLING INFORMATION				BIOLOGICAL INFORMATION				ANALYTICAL INFORMATION					REFERENCE TO ANALYTICAL METHOD FOLLOWED:				
SC ADP HPL o	SN TUM ATB TIER ON	DATE DAY MONTH YEAR	LOCATION		SPECIES NAME	N <sub>s</sub>	LENGTH		WEIGHT		E O M	C O N P O U N D	M <sub>s</sub>	CONC. (µg/kg) fresh weight	St. dev.	REFERENCE TO ANALYTICAL METHOD FOLLOWED:	
			Lat	Long			Av. lgth. cm	St. dev. cm	Av. weight. µg	St. dev. µg							

COMMENTS



Explanatory notes for completing the log form B3 for  
reporting data on Halogenated Hydrocarbons in Marine Organisms

This form is meant to provide results of analyses of halogenated hydrocarbons in marine organisms sampled according to Reference Method n° 12, Rev and analysed according to Reference Method n° 14. The list reference methods for marine pollution studies is attached. If different methods are followed, a full description of these methods or a proper bibliographic reference should be made available to the MED UNIT.

Each line should be used to report the result of a single analysis, or of the arithmetic mean and standard deviation of replicate analyses, carried out on one "specimen sample". Averaging of results from various "specimen samples" should not be reported in this form.

If several compounds (halogenated hydrocarbons) or tissues are analysed on one "specimen sample" the same SAMPLE CODE should be given in all the corresponding lines. When entering the various analytical results of the corresponding sample, the SAMPLING INFORMATION and the BIOLOGICAL INFORMATION should be specified only once when entering the first analytical result. If several tissues are analysed in a "specimen sample" the TISSUE name should be specified in each line.

The following specific instructions should be used to fill the forms :

- ALWAYS utilize first the form specified as page one.
- Place your READY MADE STICKER sent from the Med Unit on page one.
- ALWAYS use capital letters when filling in the forms.
- Always make reference to the relevant analytical method used on the first page where indicated as REFERENCE TO ANALYTICAL METHOD FOLLOWED.
- When the data entry section of the first page is full then always use ordinary forms (the ones without stickers) and write down the appropriate page number on the top left-hand side of the form.
- When all the data are reported, write down the total number of forms used (i.e. total number of pages) on the top left-hand side of the first page and staple together all the forms used for the same set of samples.

SAMPLING INFORMATION : (see Reference Method n° 12, Rev.1, Annex I)

**SAMPLE CODE** For the specimen sample code, use any numbering sequence according to your own option e.g. 123 or PE12.

**STATION NUMBER** Enter the name or station number as it appears in your Monitoring Programme. In this case the sampling location column can be left blank. If this station is not defined in your Monitoring Programme, use the sampling location column to define it.

**SAMPLING DATE** Enter the date on which the sample was collected, e.g. 1 July 1983 as 01 07 83.

**SAMPLING LOCATION** Enter the geographic co-ordinates of the location where the sample was collected, in degrees and minutes (enter E or W in the E,W column) e.g. 40 15 15 30 E. If precise coordinates are not known, try to approximate to the nearest degree and leave minutes blank e.g. 40 \_\_\_ 15 \_\_\_ E.

BIOLOGICAL INFORMATION

**SPECIES NAME** Enter the scientific name of the species sampled e.g. MULLUS BARBATUS.

**N<sub>s</sub>** Enter the number of specimens in the sample if the sample is composite e.g. 12, otherwise enter 1.

**LENGTH**

Units Enter the units used e.g. CM.

Av. Lgth Enter the arithmetic mean of the lengths of the various specimens included in the sample if the sample is composite, otherwise, enter the actual length of the individual specimen e.g. 9.00.

St. dev. Enter the standard deviation calculated for the length only if the sample is composite e.g. 0.12.



WEIGHT

Units Enter the units used e.g. KG.

Av. wght. Enter the arithmetic mean of the weights of the various specimens included in the sample if the sample is composite, otherwise enter the actual weight of the individual specimen e.g. 5.00.

St. dev. Enter the standard deviation calculated for the length only if the sample is composite e.g. 0.125.

SEX

Enter M-Male, F-Female, I-Indeterminate.

AGE

Enter estimated or average age in years e.g. 3 or ND if not determined.

TISSUE

Enter the name of the tissue analysed e.g. LIVER (refer to the list of the tissue names attached).

ANALYTICAL INFORMATION

E.O.M. Enter the percentage of extractable organic matter e.g. 21.5 .

DW/FW Enter the ratio of Dry Weight to Fresh Weight in percentage e.g. 21.5 .

COMPOUND Enter the appropriate three-digit compound code from the attached table. For compounds not listed in the Table, use usual abbreviation or the first three letters and give the full name of the compound in the column of comments..

N<sub>a</sub> Enter the number of replicate analyses of the compound analysed carried out on the same sample e.g. 5.

CONC. Enter the arithmetic mean of the concentrations obtained for each compound analysed if several replicate analyses have been carried out, otherwise enter the single value obtained, expressed with respect to fresh weight in (µg/kg FW) e.g. 10.03.

St. dev. Enter the standard deviation calculated for the concentrations reported, only if replicate analyses have been carried out e.g. 0.25.

COMMENTS

Use this section to enter:

- full name of the compound analysed
- extraction procedure
- any complementary information e.g. on the way the sample has been stored.

Further comments may be written on the back of the form with proper reference to the relevant line.

LIST OF TISSUE NAMES

The recommended tissues for analysis are the edible portions of the organisms.

For:

CRUSTACEANS

Abdomen

MOLLUSCS

Soft part

FISH

Fillet ( For bigger fish, differentiations can be made between the various fillets.)

Other tissues may be used for analysis in some organisms.

Whole body  
Soft Part  
Liver  
Kidney  
Ovary  
Testes  
Gonads  
Fillet (general)  
White  
Brown  
Pectoral  
Adductor  
Foot (molluscs)  
Pincer (crustaceans)  
Abdomen (crustaceans)  
Tentacles (cephalopods)  
Arms  
Carapace  
Shell  
Others

ORGANIC COMPOUNDS

ALD	aldrin (=octalene)	$C_{12}H_8Cl_6$
BHC = HCH	hexachlorocyclohexane, isomers $\alpha$ , $\beta$ , $\gamma$ and $\delta$	$C_6H_6Cl_6$
LIN	lindane (gammexane), $\gamma$ -isomer of BHC	
DDT	p,p'-DDT dichloro-diphenyl trichloroethane o,p'-DDT	$C_{14}H_9Cl_5$
DDE	p,p'-DDE dichloro-diphenyl dichloroethene o,p'-DDE	$C_{14}H_8Cl_4$
DDD = TDE	p,p'-DDD dichloro-diphenyl dichloroethane o,p'-DDD (For DDT and its metabolites, do not differentiate between the two isomers)	$C_{14}H_{10}Cl_4$
PCB	polychlorinated biphenyls (write in the comments column the analytical reference standard used)	
DIE	dieldrin (= octalox)	$C_{12}H_8Cl_6O$
END	endrin	$C_{12}H_8Cl_6O$
HEP	heptachlor	$C_{10}H_5Cl_7$
HOX	heptachlor epoxide	$C_{10}H_5Cl_7O$