Intergovernmental Oceanographic Commission
World Meteorological Organization
United Nations Environment Programme

Expert Consultation
on the Joint Co-ordinated
Project on

Pollution in the Mediterranean

Summary Report of a meeting held in Msida, Malta 8-13 September 1975

IOC/MPPP/3

Unesco

IOC/MPPP/3
Paris, October 1975
Original : English*

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

WORLD METEOROLOGICAL ORGANIZATION

UNITED NATIONS ENVIRONMENT PROGRAMME

Expert Consultation on the Joint Co-ordinated Project on Pollution in the Mediterranean

Including operational plans for two pilot projects:

BASELINE STUDIES AND MONITORING OF OIL AND PETROLEUM HYDROCARBONS IN MARINE WATERS; COASTAL TRANSPORT OF POLLUTION

Summary Report of a meeting
held in Msida, Malta,
8-13 September 1975

Unesco 1975

* This document is initially available in English and French.

CONTENTS

page

1. Opening of the Consultation 3
2. Adoption of the Agenda. 3
3. Background and Objectives. 4
4. The Plans of Operations 5
   4.1 Pilot Project on Baseline Studies and Monitoring of Oil and Petroleum Hydrocarbons in Marine Waters 5
   4.2 Pilot Project on Problems of Coastal Transport of Pollutants . . 5
   4.3 Matters of Relevance to Both Pilot Projects 6
      4.3.1 Remote sensing 6
      4.3.2 Training 6
      4.3.3 Technical assistance 7
      4.3.4 Data collection and processing 7
5. Co-ordinating Activities 7
6. Other Business 7
7. Adoption of the Summary Report and the Operational Documents 8
8. Closure of the Consultation 8

Annex I - Agenda

Annex II - List of Documents

Annex III - Operational Document for the Pilot Project on Baseline Studies and Monitoring of Oil and Petroleum Hydrocarbons in Marine Waters

Annex IV - Operational Document for the Pilot Project on Problems of Coastal Transport of Pollutants

Annex V - List of Participants

1. Opening of the Consultation

The IOC/WMO/UNEP Expert Consultation on the Joint Co-ordinated Project on Pollution in the Mediterranean convened by the Intergovernmental Oceanographic Commission (IOC) in co-operation with the World Meteorological Organisation (WMO) and with the support of the United Nations Environment Programme (UNEP), was held at the Royal University of Malta, Msida, from 8 to 13 September 1975.

The Consultation was charged with developing the operational documents for two pilot projects:

(a) baseline studies and monitoring of oil and petroleum hydrocarbons in marine waters;

(b) coastal transport problems of pollutants.

The participants (See Annex V) were welcomed on behalf of the IOC, of the United Nations Educational, Scientific and Cultural Organization (UNESCO) by Dr. L. Andrén, Assistant Secretary. He expressed his appreciation to UNEP for providing funds for the projects, and thanked the Royal University of Malta for hosting the meeting. He outlined the scope of the two pilot projects and the events leading to this meeting, especially the International Workshop on Marine Pollution held in Monaco between 9 and 14 September 1974 under the joint auspices of the IOC, the General Fisheries Council for the Mediterranean of FAO and the International Commission for the Scientific Exploration of the Mediterranean, as well as the UNEP Meeting on the Protection of the Mediterranean (Barcelona, 28 January - 4 February 1975) at which these pilot projects, along with five others, were endorsed and recommended for early implementation.

He stated that the IOC considers the implementation of the pilot projects as an important step towards an overall assessment of the existence and movements of pollutants, especially oil, in this region, providing an opportunity for realization of the desires expressed by several member countries. A pilot project similar to the one on petroleum monitoring is in operation on a global scale as part of the Integrated Global Ocean Station System (IGOSS).

Professor E.J. Borg Costanzi, Rector Magnificus of the Royal University of Malta, delivered an address of welcome to participants. He expressed the great interest of the University in participating in the projects, especially in view of their relation to the plans for creating an oil-combating centre where Malta may play an important rôle.

Dr. S. Keckes, on behalf of the United Nations Environment Programme greeted the participants and thanked the Intergovernmental Oceanographic Commission for organizing this joint consultation, and the Government of Malta as well as the Royal University of Malta for hosting it.

Professor S.K. El-Wakeel (Egypt) and Dr. L.J. Saliba (Malta) were elected Chairman and Rapporteur, respectively, of the Consultation.

2. Adoption of the Agenda

The Agenda (Annex I) was adopted after the Chairman's review of the tasks before the meeting and a short discussion on the time-table.

The Consultation agreed that both pilot projects would be discussed initially in plenary on general lines, and following this, each pilot project would be discussed in detail in separate panels. Dr. P. Nounou (France) and Dr. V. Pravdic

(Yugoslavia) were elected Chairman and Rapporteur respectively of the panel to discuss the pilot project on baseline studies and monitoring of oil and other petroleum hydrocarbons in marine waters. Professor S.K. El-Wakeel (Egypt) and Dr. D.A. Havard (Malta) were elected Chairman and Rapporteur respectively of the panel to discuss the pilot project on coastal transport problems of pollutants. Each panel was charged with the task of preparing the relevant operational document for the pilot project in question.

5. Background and Objectives

In introducing this item the Chairman said that unlike the meetings at Monaco and Barcelona that had decided on general principles, the present Consultation should consider technical and scientific aspects and operational and logistic implications.

The operational documents should be prepared in such a way as to make them suitable bases for agreements between the sponsoring agencies and the participating countries and their designated research centres. The present manpower and resource capabilities of the laboratories concerned and the training and equipment requirements of each one should be reviewed.

As envisaged by the UNEP Intergovernmental Meeting in Barcelona, participation in the pilot projects should, at this stage, be restricted to institutions from Mediterranean coastal states, and the geographical area covered should be the Mediterranean Sea proper, from the Strait of Gibraltar to the Sea of Marmara. This would not exclude liaison with institutions in other countries engaged in relevant research in the Mediterranean. As consideration should be based on best available collective scientific knowledge, experts from outside the region would be consulted as and when deemed desirable.

The Mediterranean research centres which had previously expressed a wish to participate in the programme had been invited to send representatives to the Consultation and the IOC had made efforts to ensure representation from a maximum number of countries bordering on the Mediterranean, particularly the developing ones.

Dr. Keckes, in reviewing the background for this Consultation reiterated the decision of the Intergovernmental Meeting on Protection of the Mediterranean (Barcelona, 28 January - 7 February 1975) to endorse an Action Plan. As part of this Action Plan the early implementation of seven pilot projects was requested in the frame of a Co-ordinated Mediterranean Pollution Monitoring and Research Programme. These pilot projects will be executed by national research centres and their execution will be closely co-ordinated by UNEP and the United Nations specialized agencies concerned (General Fisheries Council for the Mediterranean of FAO, IOC, World Health Organization, WMO). This Consultation is convened in order to develop the Operational Documents for two of the seven pilot projects. The documents will be submitted to the Mediterranean Governments, and they will be asked to nominate their national research centres which will participate in the pilot projects and to clear the national programmes which will be considered as parts of the pilot projects. Substantial funds are available at UNEP to support the participation of the national research centres in the pilot projects, particularly those from the developing countries.

Participation in the pilot projects would have to be approved by the governments concerned and agreed by the relevant United Nations agencies before they could become operational.

It was recognized that any research carried out by institutions should be in conformity with the provisions of International Law regarding the sovereign rights and jurisdiction of coastal states.

4. The Plans of Operation

4.1 Pilot Project on Baseline Studies and Monitoring of Oil and Petroleum Hydrocarbons in Marine Waters

The Consultation considered the Draft Operational Documents for the Pilot Project on Marine Pollution Monitoring under the framework of IGOSS (IOC/WMO/MPMSW-I) and the Secretariat Note (IOC/MPPP/5) thereon. That Plan was accepted as a basis for the development of the Operational Document, with adaptations as required to make it suitable for the Mediterranean.

It was suggested that apart from ocean data stations, which would be necessary for measurement of most parameters, ships of opportunity could be used in the whole of the Mediterranean, especially in major shipping lanes, for observation and sampling of oil slicks. It was recognized that monitoring of the open waters was necessary, as additional information on the situation in these areas was required. In areas where monitoring of petroleum hydrocarbons is being performed, data on the physical and chemical properties of sea water should be made available to all participating research centres.

The importance of intercalibration and standardization of equipment and methodology was emphasized, and IOC was requested to assist in this regard.

The Consultation gave careful consideration to the various available methods for analysis of petroleum hydrocarbons in sea water. It was recommended that fluorescence spectrophotometry be used as the reference method in view of its adequate sensitivity for estimating aromatic hydrocarbons, its simplicity in use, and its being less subject to error both in operation and interpretation of data.

Chromatographic techniques and infra-red (IR) spectrometry could be used to obtain additional information. It was recognized that the cost of chemicals used in any of the mentioned analytical techniques could be considered as a limiting factor.

In discussing the methodology for sampling and analysis of tar balls on beaches, the importance of this study for the Mediterranean region and the urgent need for further review of the methodology proposed in Appendix III of Annex III were pointed out.

Therefore, it was agreed:

(i) to encourage participating research centres to develop statistically significant procedures;

(ii) until a standard procedure is developed participating research centres should follow as closely as possible the methodology for monitoring tar balls on beaches proposed in Appendix III of Annex III;

(iii) to request IOC, WMO and UNEP to collect the information on methods used and to convene a small task team under the IGOSS Pilot Project to recommend standard procedures.

4.2 Pilot Project on Problems of Coastal Transport of Pollutants

The Consultation considered the outline for a plan of operations for a co-ordinated study of coastal circulation in the Mediterranean with special reference to marine pollution prepared by the IOC Secretariat (IOC/MPPP/6). In discussing the scope of the project some participants felt that the project should cover both dynamic aspects of coastal water masses and studies on the transport and distribution of the principal pollutants along the coast by the sea, principally near the main sources of pollutant injection.

It was suggested that because the planned joint activities of UNEP, Economic Commission for Europe (ECE), United Nations Industrial Development Organization (UNIDO) and WHO to prepare an inventory of pollutants entering the Mediterranean from land-based sources, are already under way, co-ordination with this pilot project would be useful at a later stage.

It was agreed that it would be important to prepare guidelines for sampling methodology to permit comparison of results and to facilitate broad participation. The choice of techniques and methodology would be such as to satisfy the minimum requirements in sensitivity and accuracy. In the same regard, consideration would be given to ensuring simplicity in operational procedures and maintenance of instruments.

4.3 Matters of Relevance to both Pilot Projects

After discussing each pilot project in detail, both panels presented their operational documents, (Annex III and IV) and those elements common to both pilot projects were discussed in plenary session.

4.3.1 Remote sensing

The rôle of remote sensing both from aircraft and satellites was discussed. This method offers great possibilities for monitoring marine pollution. Many of the techniques are weather/light independent and are capable of rapid, efficient observation over large areas. This approach would provide a further dimension to the measurement of pollution extent and the circulation of coastal waters.

4.3.2 Training

The Consultation agreed that as country requirements and capabilities were not the same for both pilot projects, in view of their different nature, specific requirements would have to be compiled for each pilot project, identifying the needs and possibilities for training within the Mediterranean area.

The full participation in the pilot projects would depend on the availability of fully-trained teams, and therefore, training opportunities with a duration of one to six months should be organized particularly having in mind the needs of developing countries in the area. Efforts should be made to start training as soon as possible.

Selection of trainees for on-the-job training e.g. on research ships and in laboratories should be made with due regard to the need to ensure that such trainees would be engaged in follow-up work in their home country up to the end of the pilot projects. Participating research centres would have to provide a firm commitment on such follow-up work.

As far as possible, training should be carried out at well-equipped and experienced research centres within the Mediterranean region, and countries should provide detailed information about facilities in this respect.

Special emphasis should be given to ship-board training, as distinct from training in laboratory techniques.

Data analysis and processing should be included as a field in which training is required.

Training could possibly be organized at two levels, one for senior scientific staff who would be acting as project leaders within their institutions, and the other for junior staff.

The training activities should be closely co-ordinated within the pilot projects, and with similar activities of the organizations responsible for the co-ordination of the pilot projects, for example the IOC programme for Training, Education and Mutual Assistance (TEMA), and the WMO Executive Committee Panel on Training and Education.

4.3.3 Technical assistance

The potential requirements of participating research centres for instruments, sampling equipment and chemicals were reviewed, and an informal list of recommended instruments was brought to the attention of the co-ordinating bodies for the pilot projects.

It was also pointed out that maintenance, repair and calibration of instruments involved in the pilot projects should be ensured by providing the research centres of riparian states with adequate infrastructure, and maintenance facilities whenever possible.

4.3.4 Data collection and processing

The data gathered in the course of each pilot project should be able to be exchanged and recorded in order to permit any comparisons or syntheses considered useful. It was agreed that observance of the rules proposed by the IOC Working Committee for International Oceanographic Data Exchange (IODE) will further this purpose.

Taking into account that the IODE Working Committee had recommended in this connexion that a Responsible National Oceanographic Data Centre (RNODC) be selected from among volunteer centres with adequate resources, to take charge of the project or projects, it was suggested that a joint IOC/WMO circular letter be sent to national centres participating in the pilot projects recalling the terms of reference of an RNODC, and inviting them to send in their data according to the procedure laid down for Data Centres so appointed.

5. Co-ordinating Activities

The specific ways and means of the co-ordinating activities relevant to each of the two pilot projects are given in the relevant Operational Document.

The sponsoring agencies were requested to take responsibility for the needed co-ordination within and between the two pilot projects developed at this Consultation as well as with the IGOSS Pilot Project on Marine Pollution. The overall co-ordination with the seven pilot projects of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme would be a task for UNEP which was requested to ensure their harmonious development in collaboration with the United Nations Agencies concerned.

In addition, it was recommended that the sponsoring bodies keep the Mediterranean scientific community, and particularly all the research centres participating in the seven pilot projects regularly informed about the results obtained in the development of these pilot projects, as well as about news pertinent to the Mediterranean Action Plan. Such information could be provided by periodically issued newsletter published in a suitable form, which should consist of entries prepared by the U.N. bodies concerned and by scientists from the region.

6. Other Business

The Consultation requested the Chairman, in his capacity as a Vice-Chairman of IOC, to draw the attention of those Member States of IOC interested in the pilot projects.

discussed during the meeting to the urgent need to provide replies to the UNEP request to designate participating laboratories, and select their areas of investigation, so that these projects could be initiated early in 1976. It was suggested that this could be done during the forthcoming ninth session of the Assembly of IOC in October 1975.

Recognizing that knowledge already available would considerably facilitate and accelerate investigations in some areas, the Consultation recommended that efforts should be made to draw up, extend, or complete a bibliography of the Mediterranean Sea. Publication of data and collected reprints relevant to the pilot projects could be done with the financial assistance of UNEP, if necessary.

To accelerate the completion of this bibliography, and to facilitate its utilization, it is proposed that this be introduced into the joint FAO/IOC Aquatic Sciences and Fisheries Information System (ASFIS).

The Consultation was informed about a Directory of the Mediterranean Research Centres being prepared by UNEP in collaboration with the specialized agencies and considered it as an activity which would contribute to the better mutual information and collaboration.

7. Adoption of the Summary Report and the Operational Documents

The Summary Report and the Operational Documents were adopted on 13 September 1975. In this connexion it was agreed that IOC would undertake to arrange for early translation and official communication of the Summary Report in English and French and that Spanish and Arabic versions might be issued at a later stage.

8. Closing of the Consultation

In closing the Consultation, the Chairman reiterated the thanks already expressed to IOC and UNEP for convening the meeting, and to the host country. He also expressed his thanks to the participants, to the officials, and to the supporting staff. Similar thanks were also expressed by the representatives of IOC and UNEP, speaking on behalf of their respective organizations.

The Consultation closed at 13.30 on 13 September 1975.

AGENDA AS ADOPTED *

1. Opening of the Consultation
2. Adoption of the Agenda
3. Introduction and background information
4. Common objectives of the projects
5. Plans of operations
   - 5.1 Introduction
   - 5.2 Basic components
     - 5.2.1 Parameters to be studied
     - 5.2.2 Complementary data required
     - 5.2.3 Geographical distribution of stations
     - 5.2.4 Means for data acquisition
     - 5.2.5 Laboratories to perform analyses
     - 5.2.6 Products and services
     - 5.2.7 Time plan
   - 5.3 Interim evaluation and development of the project
   - 5.4 Administrative arrangements in support of the project
   - 5.5 Training and assistance
6. Co-ordination of the projects
7. Other matters
8. Adoption of the report
9. Closing of the Consultation

* Note: The adopted agenda was not followed exactly during the discussion and this report follows in general the order of discussion. So far as item 4, The Plans of Operations (item 5 in the Adopted Agenda above), is concerned, much of the discussion which took place in panel sessions has been incorporated in the Operational Documents (Annexes III and IV) and does not therefore appear in the text of the report.

LIST OF DOCUMENTS

IOC/MPPP/1	Provisional agenda and time-table
" "/2	List of participants
" "/3	Summary Report (this document)
" "/4	Provisional list of documents
" "/5	Secretariat note on the Operational Plan for the Pilot Project on Marine Pollution Monitoring under the Framework of IGOSS
" "/6	A proposal for a plan of operations for a co-ordinated study of coastal circulation in the Mediterranean with special reference to marine pollution (IOC/INF - 246)

Information documents:

IOC-WMO/MPMSW-I	Operational Plan for the Pilot Project on Marine Pollution Monitoring under the Framework of IGOSS modified by the Joint IOC/WMO Task Team II on Marine Pollution Monitoring, National Oceanic and Atmospheric Administration (NOAA), Rockville, Md., U.S.A., 20-22 May 1974.
GESAMP-IV/19	Transport and dilution of pollutants and marine pollution monitoring (Extract from the report of the Fourth Session of Group of Experts on the Scientific Aspects of Marine Pollution, Geneva, 18-23 September 1972.
GESAMP-V/4.2	Physical factors governing transport and dilution of pollutants in the sea (G. Kullenberg); extract from the report of the Fifth Session of GESAMP, Vienna, 18-23 June 1973.
FAO/FID-PPM/74/INF.3	Hydrography of the Mediterranean (H. Lacombe, P. Tchernia); Paper submitted at the FAO Consultation on the Protection of Living Resources and Fisheries from Pollution in the Mediterranean, Rome, 19-23 February 1974.
GFCM, Stud. Rev. No. 51	The State of Pollution in the Mediterranean and Legislative Controls (Extract: Pollution by oil) FAO, Rome, 1972.
U.S. Dept. Commerce/National Bureau of Standards: 1974	Marine Pollution Monitoring (Petroleum) Proceedings of the IOC/WMO/USDC Symposium and Workshop, Gaithersburg, Md., U.S.A., 13-17 May 1974. National Bureau of Standards (U.S.) Special Publication No. 409, Washington 1974, 293 p.

IOC/WMO/UNEP

Joint Co-ordinated Pilot Project on Baseline Studies and Monitoring of Oil and Petroleum Hydrocarbons in Marine Waters

OPERATIONAL DOCUMENT

Malta, September 1975

CONTENTS

		page
1.	General Introduction	3
2.	Outline of the Pilot Project	3
3.	Programme of the Work.	4
	3.1 Areas of monitoring.	4
	3.2 Parameters to be monitored	4
	3.3 Sampling methodology	4
	3.4 Analytical procedures	5
	3.5 Frequency of observations and measurements	5
	3.6 Data handling.	5
4.	Participants in the Pilot Project.	6
5.	Training Needs	6
6.	Requirements for Technical Assistance	6
7.	Timing.	7
8.	Co-ordinating Activities.	7
9.	Reports	7

Appendix I — Operational Plan for the Pilot Project on Marine Pollution Monitoring under the framework of IGOSS

Appendix II — Procedures for Sampling and reporting hydrocarbons dissolved and dispersed in sea water. Extract from: "U.S. Department Commerce/National Bureau of Standards: Marine Pollution Monitoring (Petroleum). Proceedings of the IOC/WMO/USDC Symposium and Workshop. Gaithersburg, Md., U.S.A., 13-17 May 1974", p. 281-284.

Appendix III — Recommended Procedure for Analyses of Tar Balls

1. General Introduction

Under the joint auspices of the Intergovernmental Oceanographic Commission (IOC), the General Fisheries Council for the Mediterranean (GFCM of FAO) and the International Commission for the Scientific Exploration of the Mediterranean (ICSEM), the United Nations Environment Programme (UNEP) supported an International Workshop on Marine Pollution in the Mediterranean (Monaco, 9-17 September 1975). The Workshop defined the pollution of coastal waters as the main problem in the Mediterranean and attributed it to the general lack of adequate systems for the treatment and disposal of domestic and industrial waste, to the input of petroleum hydrocarbons and organochlorines, and to the presence of pathogenic micro-organisms. The Workshop reviewed the available information on current regional programmes as well as on the research and monitoring facilities in the Mediterranean, and outlined several pollution monitoring and research pilot projects for the Mediterranean.

At the UNEP Intergovernmental Meeting on the Protection of the Mediterranean, which was held in Barcelona from 28 January to 4 February 1975, seven pilot projects outlined by the Monaco Workshop were endorsed as parts of a Co-ordinated Mediterranean Pollution Monitoring and Research Programme whose early implementation was recommended as an element of the adopted Mediterranean Action Plan.

A joint IOC/WMO/UNEP Consultation was held in Malta (8-13 September 1975) to develop an operational document for two of these pilot projects :

baseline studies and monitoring of oil and petroleum hydrocarbons in marine waters, and

coastal transport problems of pollutants.

Experts of the countries bordering the Mediterranean proper, and several experts from outside the region were invited in order to discuss the two pilot projects and prepare the operational documents which will serve as the basis for the co-operation of the Mediterranean national research centres participating in the pilot projects. The Consultation was convened as part of the Mediterranean Action Plan adopted by the UNEP Intergovernmental Meeting on the Protection of the Mediterranean.

Since the pilot project on baseline studies and monitoring of oil and petroleum hydrocarbons in marine waters will be considered as part of the Integrated Global Ocean Station System (IGOSS), the Operational Plan for the Pilot Project on Marine Pollution Monitoring under the framework of IGOSS (APPENDIX I), as developed by the Joint IOC/WMO Planning Group for IGOSS at its Second Session(IPLAN-II, Paris, 13-17 August 1973) and as modified by the Joint IOC/WMO Task Team II on Marine Pollution Monitoring (May 1974) was used as the basic background document in developing this Operational Document.

2. Outline of the Pilot Project

Baseline data on particulate, dispersed and dissolved oil, petroleum hydrocarbons, oil slicks and floating tar balls are urgently needed for the Mediterranean because of the present level of pollution by petroleum hydrocarbons and because of imminent increase in the quantity of petroleum to be transported after the reopening of the Suez Canal.

The proposed pilot project will deal primarily with the contamination of coastal waters by these substances. The levels and trend of pollution in open waters will be also studied. The immediate objective of the pilot project will be to monitor marine pollution by oil and petroleum hydrocarbons in order to obtain a picture of their distribution and dynamics in the Mediterranean, with the ultimate goal of providing the reparian states of the Mediterranean with information on which measures might be based.

3. Programme of the Work

3.1 Areas of monitoring

In view of the threat to coastal regions from pollution by petroleum hydrocarbons, the participating states are asked to designate their most critical coastal areas for studies within the frame of this pilot project.

The baseline studies and monitoring will be primarily restricted to the coastal waters of the Mediterranean according to the pattern defined by the coastal states taking into account the routes of oil transportation, areas of loading/discharging, regions of offshore oil production and the major current systems.

Monitoring and baseline studies beyond the limits of territorial waters will be carried out either on the initiative of individual riparian countries or as a joint operation between several riparian countries.

Monitoring in the following non-coastal regions (excluding territorial waters) is particularly recommended (Fig. 1).

Western Mediterranean (41° 30'N/38° 00'N - 3° 00'E/7° 00'E)

Tyrrhenian and Ligurian Sea (41° 00'N/38° 00'N - 11° 00'E/14° 00'E)

Adriatic Sea (North of 44° 00'N)

Ionian Sea (36° 00'N/34° 00'N - 17° 00'E/21° 00'E)

Eastern Mediterranean (35° 00'N/32° 30'N - 27° 00'E/32° 00'E)

3.2 Parameters to be monitored

In the context of this pilot project observations will be made of the following:

oil slicks and other floating pollutants, floating particulate petroleum residues or "tar balls";

dissolved/dispersed petroleum hydrocarbons in the surface waters;

tar on beaches.

To achieve a better evaluation of the obtained data, additional parameters should be recorded whenever possible at the time of sampling or observations as specified in Appendix I.

3.3 Sampling methodology

The general operational procedures outlined in Appendix I will be followed.

The techniques of sampling for petroleum hydrocarbons in sea water should conform as closely as possible with the description given in Appendix II.

No standard, statistically significant procedures are available for tar ball sampling and analysis on sandy beaches. Therefore, participating research centres are requested to provide detailed information on the methodology they are using at the present time.

The most suitable means for initiating the pilot project are considered to be:

(a) visual observation of oil slicks and other floating pollutants by:

research vessels;
voluntary observing ships, fishing vessels;
suitable offshore platforms;
aircraft;

(b) tar ball sampling by:

research vessels;
other vessels designated by Mediterranean states;
coastal stations, islands and offshore platforms;

(c) sea water sampling by:

research vessels;
other vessels suitably staffed and equipped;

(d) surveys of tar on beaches.

3.4 Analytical procedures

The general procedures for the pretreatment of samples should follow the description given in Appendix I.

The method of analysis for petroleum hydrocarbons should be fluorescence spectrophotometry. In addition relevant chromatographic techniques and IR-spectroscopy can be used for obtaining complementary information.

As part of intercalibration efforts a central distribution of standardized oils for calibration purposes for any of the analytical methods used will be organized in close collaboration with IGOSS.

For analysis of tar balls the procedure described in Appendix III will be used.

3.5 Frequency of observations and measurements

Visual observation of oil slicks and other floating pollutants will follow instructions given in Appendix I.

Sampling for floating particulate petroleum residues or "tar balls", and for dissolved/dispersed petroleum hydrocarbons should be made concurrently, whenever possible.

The minimum sampling frequency will be once each season for coastal regions. In open waters sampling should be done at least once a year. Whenever feasible more frequent sampling should be carried out.

3.6 Data handling

The collection and reporting of data will follow the format set out in Appendix I and will be carried out in close collaboration with IGOSS.

The first evaluation of the data obtained will be made by the research centres which have collected them.

Whenever possible, all the data will be forwarded to the National Co-ordinators for the IGOSS pilot project for further evaluation and consolidation into a national report.

The co-ordinating agencies for this pilot project (IOC/WMO/UNEP) will make the final evaluation within the framework of IGOSS and will be responsible for informing the research centres participating in the network about the obtained results.

4. Participants in the Pilot Project

A number of Mediterranean research centres have expressed the wish to participate in the pilot project. These were identified during a feasibility study on the execution of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme carried out by two IOC consultants on behalf of UNEP, and using additional information from other sources. In addition several Mediterranean governments have already agreed to participate in the IGOSS Pilot Project and nominated their national co-ordinators.

Participating Mediterranean research centres will be organized into a network. Membership of the network will not be limited to research centres able to deal with all aspects of the proposed working programme but may also include those research centres which are capable of only limited initial contributions whilst under development.

Research centres may join the network at any time they wish. However, their participation in the pilot project, as well as the programmes they are proposing as their contribution, will have to be cleared by their relevant national authorities.

5. Training Needs

The lack of adequately trained scientists and technicians to perform the necessary observations and analytical work seriously hinders the full participation of all national research centres which expressed the wish to become part of the network participating in the execution of the project. Fellowships for in-service training of up to six months each will therefore be awarded, with priority being given to those national research centres whose full participation in the pilot projects depends on adequately trained staff. The fellowships will be available from the start of the programme. All training will be carried out in Mediterranean research centres having adequate facilities and experience in such activities.

Trainees will be selected from national research centres which provide an assurance that the trainee will continue to work on the project upon return to his home centre. The training centres shall, after return home of the trainees, continue to maintain regular contact.

6. Requirements for Technical Assistance

To improve the technical facilities of the participating research centres, analytical instruments as well as chemicals, standards, and sampling tools will be provided through the sponsoring agencies of the pilot project.

Common maintenance services will be organized through the sponsoring agencies for the analytical instruments provided for the pilot project.

Selection of the recipient centres will be based on the actual need for the requested assistance, particularly in the national research centres of the developing countries, and assurance from the recipients that they will provide adequate facilities for the installation, maintenance and operation of the equipment, as necessary for the purposes of the pilot projects.

7. Timing

The total duration of the operational phase of the pilot project will be two years, starting from 1 January 1976.

8. Co-ordinating Activities

Co-ordination of the work performed on the basis of this Operational Document by the network of participating Mediterranean research centres will be organized in close collaboration between IOC, WMO and UNEP, taking into account the fact that the pilot project is considered to be part of IGOSS, and using the national co-ordinators for the IGOSS Pilot Project, whenever possible, as the responsible national counterpart.

Such co-ordination may include:

correspondence with research centres and national authorities;

organization of data reporting, evaluation and dissemination;

organization of the training programme;

organization of technical assistance;

periodic review of participating research centres and efforts to enlarge the network of participants;

contacts with other similar projects elsewhere,

organization of meetings of experts from participating research centres whenever necessary,

co-ordination of the visit of experts,

any other activity relevant to the execution of the pilot project.

The activities envisaged in the frame of this pilot project will be co-ordinated with the activities of other pilot projects in the frame of the Co-ordinated Mediterranean Pollution Mediterranean Pollution Monitoring and Research Programme endorsed by the UNEP Intergovernmental Meeting on the Protection of the Mediterranean.

9. Reports

A mid-term and final report will be prepared 12 and 24 months after the pilot project becomes operational. In addition, progress reports will be prepared six and eighteen months after the beginning of the pilot project operational phase.

Distribution: limited

IOC-WMO/MPMSW-I
Task Team II
Original: English

UNITED NATIONS EDUCATIONAL
SCIENTIFIC AND CULTURAL ORGANIZATION
INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC)

WORLD METEOROLOGICAL ORGANIZATION (WMO)

OPERATIONAL PLAN FOR THE PILOT PROJECT ON MARINE POLLUTION MONITORING UNDER THE FRAMEWORK OF IGOSS

modified by the Joint IOC/WMO Task Team II
on Marine Pollution Monitoring

National Oceanic and Atmospheric Administration
(NOAA), Rockville, Md., U.S.A., 20-22 May 1974

Contents

Operational Plan for the Pilot Project on Marine Pollution Monitoring under the Framework of IGOSS

Appendix I: Visual Observation of Oil Slicks and Other Floating Pollutants.

Appendix II: Procedures for the Sampling and Reporting of Particulate Petroleum Residues (Tar Balls)

Appendix III: Tar Sampling on Beaches

Appendix IV: Procedures for Sampling and Reporting Petroleum Hydrocarbons Dissolved and Dispersed in Sea Water

OPERATIONAL PLAN FOR THE PILOT PROJECT ON MARINE POLLUTION MONITORING UNDER THE FRAMEWORK OF IGOSS

I. INTRODUCTION

It is recognized that some degree of marine pollution monitoring is required and is indeed currently being prosecuted by various national authorities and within some regional frameworks. The eventual nature and scale of marine pollution monitoring will however depend upon the conduct of suitable baseline surveys to delineate the areas of significant contamination which, when taken together with adequate data on pollutant inputs, pathways and exposure criteria, will permit the optimal deployment of resources in routine monitoring operations including those related to regulatory functions within international conventions for the control of marine pollution. It may be necessary from time to time to repeat baseline surveys, or elements of them in order to establish long-term trends, but in general a sensibly designed monitoring operation based on the results of a baseline survey should obviate the need for oft-repeated baseline surveys, provided that the monitoring operations include routine assessment of inputs.

We are some way from realizing the later stages of the development of such programmes but a start needs to be made now in order to develop the necessary machinery within which to coordinate baseline surveys and develop monitoring capability to the point where a world-wide picture may be obtained. It has been accepted that IGOSS provides a suitable framework for the coordination of marine pollution monitoring activities in respect to physical and chemical parameters that are fairly easily monitored with present, widely available technology but that it must depend upon current and forthcoming national and regional studies as the basis for programme development and furthermore, that it should recognize that the investigations to be coordinated by GIPME will show how monitoring for other chemical and/or biological parameters can be developed on a sound scientific basis.

Taking this background as a basis for its deliberations IPLAN and its subsidiary bodies have recommended that a pilot project be conducted in order to establish the necessary organizational machinery to enable it to discharge its coordinating role in a developing marine pollution monitoring programme. The selected vehicle for this project is petroleum derived oils since it is possible to base a pilot project capable of involving nations with widely varying degrees of expertise and capable of providing examples of the type of organizational problems which will have to be overcome in any coordinated exercise on Marine Pollution monitoring. Its selection should not be taken as reflecting any judgement on the part of IGOSS as to the magnitude and nature of the marine oil pollution problem merely that it is the most convenient vehicle on which to base the test exercise.

In designing the pilot project it was thought initially desirable to limit it to areas of immediate interest and to objectives for which there are feasible technical solutions. However, some later desirable additions have been noted and proposed as development projects to be included in the pilot project as preparatory work for later phases.

An IOC/WMO Symposium and Workshop on Marine Pollution Monitoring (Petroleum) was held at the National Bureau of Standards, Gaithersburg, Maryland, May 13-17, 1974. The proceedings of this symposium and workshop will be published. A number of modifications to the Operational Plan for the Pilot Project on Marine Pollution Monitoring under the framework of IGOSS (Annex V to IOC-WMO/IPLAN-II/3) was agreed upon during the Workshop. The following document incorporates these modifications.

Agreement was reached that the remainder of 1974 would be required to complete the preparatory work; therefore, the actual monitoring will start January 1, 1975. It has been suggested that IOC/WMO arrange for a workshop to be held early in 1976 to review the progress made during the first year of the Pilot Project.

Upon completion of the two year Pilot Project, a review of the results by ICG GIPME is envisaged, and it is hoped that extension to the assessment of other contaminants may be considered at that time. Meanwhile, it is recognized that national authorities will continue to address themselves to those marine pollution monitoring programmes of prime importance to them, and that extension of the coordinated programme will have to take account of this.

II. BASIC COMPONENTS OF THE PILOT PROJECT

The Pilot Project is conceived as a valid test of the ability of IGOSS to respond to a need for specific data in the ocean-atmosphere system. The ultimate goal of the Pilot Project is to monitor marine pollution by petroleum in order to obtain a picture of its' distribution and dynamics on a global scale. In keeping with the accepted theme of IGOSS whereby established effort, perhaps at the national or regional level, is gradually developed into a global organization, it is proposed that the Pilot Project should draw from other established programmes. The IOC and WMO Secretariats contacted Member States requesting a statement of their interest, participation and capability in developing the Pilot Project and asked them to designate National Coordinators and participating laboratories. The information received from Member States is summarized in the report of the Joint IOC/WMO Task Team I, (IOC-WMO/MPMSW-I) (Pilot Project on Marine Pollution Monitoring (Petroleum): Responses to the Joint IOC/WMO Circular Letter No. 10).

1. Parameters to be monitored

Within the context of oil pollution monitoring and depending on the capabilities of Member States, the following should be included:-

(a) Oil slicks and other floating pollutants
(b) Floating particulate petroleum residues or "tar balls"
(c) Tar on beaches
(d) Dissolved/dispersed petroleum hydrocarbons in the surface waters (1 metre; additional depths are optional) of the ocean

Based on the recommendations of the workshop, provisional guidelines for monitoring the above listed parameters are provided in the Operational Plan. Member States are encouraged to participate in as many parts of the programme as possible.

2. Complementary environmental information

In order to evaluate the data, parameters listed below as selected from the standard "IGOSS Optional Environmental Information" should be obtained when possible at the time of sampling and be included in the sampling log (see Logs shown in Appendixes I through IV):

(a) sea temperature
(b) air temperature
(c) wind speed and direction

The following additional environmental data would be useful:

(a) salinity
(b) dissolved oxygen
(c) pH
(d) current speed and direction
(e) wave period and height

3. Areas for monitoring

The areas for the Pilot Project have been determined from existing national and regional programmes, regions of offshore oil production, the main routes of oil transportation, and the major ocean currents. The following areas are judged to be the most suitable for initiating the Pilot Project:

(a) The Atlantic Ocean north of 5°S. This includes a tropical region in which sea water temperatures may be high enough to speed degradation processes;

(b) The Caribbean, the North Sea, the Mediterranean Sea and Gulf of St. Lawrence in which monitoring programmes are in progress or planned;

(c) The Norwegian Sea and Barents Sea in order to investigate the transport of pollutants by ocean currents;

(d) The oil tanker route from the Arabian Sea around the Cape of Good Hope to Europe and the route from the Arabian Sea to Japan;

(e) An area off the west coast of South America lacking tanker traffic but of similar oceanographic character to that off West Africa.

4. Means of data acquisition

The most suitable platforms for initiating the pilot project under each of its monitoring aspects are considered to be:

(a) Visual observation of oil slicks and other floating pollutants by:

(i) Ocean weather ships and research vessels,
(ii) Voluntary observing ships, fishing vessels and their supporting ships,
(iii) Suitable offshore platforms,
(iv) Aircraft.

(b) Tar ball sampling by:

(i) Ocean weather ships and research vessels,
(ii) Other vessels designated by Member States,
(iii) Coastal stations, islands and offshore platforms.

(c) Surveys of tar on beaches

(d) Sea water sampling by:

(i) Research vessels,
(ii) Ocean weather ships,
(iii) Other vessels suitably staffed and equipped.

5. Laboratory network for the analysis of samples

Laboratories carrying out the analyses of samples should ensure as far as possible the comparability of the analytical results by adopting the methods described in Appendices II and IV.

Member States have been asked by the Secretariats to identify those laboratories or analytical centres participating in the Pilot Project and indicating in each case their involvement and capability with respect to the parameters to be monitored, complementary environmental information, areas for monitoring and to identify requirements for technical and other assistance. See report of Joint IOC/WMO Task Team I (IOC-WMO/MPMSW-I).

The Secretariats are requested to collect and distribute information on recommended sampling, sample preservation, and analytical methods.

6. Products and services

The National Coordinators should arrange for all data obtained by visual observations and by analysis of collected samples to be forwarded to appropriate national archiving centers, and to the IGOSS Responsible National Oceanographic Data Center (RNODC's)* for the generation of statistical summaries, archival, and retrieval. Advice for archiving and retrieval should be provided by the IOC Working Committee on International Oceanographic Data Exchange.

It is envisaged that major products may be developed as follows:-

(a) Regular information concerning the horizontal distribution of concentrations of petroleum hydrocarbons dissolved in the upper layers of the oceans

(b) Data from fixed points (e.g. OWS) on hydrocarbon concentrations in order to study temporal variations

(c) Regular information on the horizontal distribution of tar balls and oil slicks and other pollutants on the ocean surface.

7. Period of monitoring

After a preparatory stage, the monitoring program will begin January 1, 1975 and will continue for a 24 month-period during which it would be expected to intensify.

III. INTERIM EVALUATION AND DEVELOPMENT OF THE PILOT PROJECT

The Pilot Project has entered a management phase intended to enhance international coordination and cooperation, and a scientific phase which will carry out data gathering, analysis, interpretation, and communication. In the interest of exploring all problem areas effectively and efficiently, information should continue to be exchanged within and between the two phases of the Pilot Project through correspondence and meetings. Many Member States have designated National Coordinators as focal points for the coordination of the Pilot Project within their respective nations. See Annex I of the Report of Joint IOC/WMO Task Team I (IOC-WMO/MPMSW-I).

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* To date these centers are:

(1) US NODC
(2) USSR NODC
(3) France BNDO

Japan anticipates that over the next two years, the archiving of IGOSS related data will become the responsibility of the Japan Oceanographic Data Center.

IV. ADMINISTRATIVE ARRANGEMENTS IN SUPPORT OF THE PILOT PROJECT

It is proposed that a small joint IOC/WMO Task Team continue to be made available to assist the Secretariats in the planning and execution of the operational aspects and evaluation of the Pilot Project. Members of the Task Team will be required to assist in the management of the work for which funds from UNEP have been requested.

V. TRAINING, EDUCATION AND ASSISTANCE

Member States have identified their training, education and assistance requirements (See Report of the Joint IOC-WMO Task Team I (IOC-WMO/MPMSW-I)). Member States with established facilities are requested to indicate the assistance they could provide in training, training aids, laboratory facilities, experts and consultants. These requirements should be considered by the IOC Working Committee on Training, Education, and Mutual Assistance (TEMA).

VI. SUMMARY OF ACTIONS FOR IMPLEMENTATION OF THE PILOT PROJECT ON MARINE POLLUTION MONITORING

1. Encourage additional Member States' participation and nomination of National Coordinators.

2. National Coordinators exchange information on management of the Pilot Project and methods of evaluating and exchanging scientific information.

3. An interim Workshop be convened in January 1976 to review the progress of the Pilot Project.

4. IOC Working Group on International Oceanographic Data Exchange be asked to develop a plan for recording, transmitting, storing, archiving and retrieval of information arising from the marine pollution monitoring programme with the view of making recommendations for further development of the Pilot Project.

5. Upon completion of the Pilot Project, a Task Team be formed to draft a comprehensive report, including management and scientific aspects, to be distributed for review as arranged by the Secretariats. The report should be evaluated in conjunction with the ICG for GIPME and recommendations should be made to the IOC Working Committee for IGOSS and the WMO Executive Committee Panel on Meteorological Aspects of Ocean Affairs for the next steps of marine pollution monitoring.

6. IPLAN, on the basis of the report and recommendations received, develop a plan to continue monitoring of petroleum in the marine environment and to extend the program to include other pollutants.

APPENDIX I

VISUAL OBSERVATION OF OIL SLICKS AND OTHER FLOATING POLLUTANTS

1. Area as outlined in item 3 of the plan "Areas for monitoring".

2. Frequency of observation:

Whenever floating oil, petroleum residues and other floating pollutants are in view. A negative report is required at local noon if no floating pollutants have been observed in the last 24 hours.

3. Methods of sampling:

No instrumentation is involved. Observations will be made visually. Polarizing glasses may be useful in detecting oil slicks. A specific reporting format (log form: Attachment 1) is provided to record the observations. Instructions for the completion and mailing of the form are given in Attachments 1A, 1B and 1C.

All reporting logs are to be mailed upon arrival in the port to the designated National Coordinators.

4. Experimental products and services

The centres designated for analysis of the visual observations of floating materials should develop experimental products which reflect the periodic distribution of pollutants observed on the sea surface. These may be developed on the basis of integrating the data reported over suitable periods (e.g. 10-day, 15-day or 30-day durations).

Depending upon the types and amounts of data reported, the experimental products might be presented graphically as plotted numerals or symbols on a chart or in statistical listings by Marsden squares or such other appropriate listings. An early exchange of the designs or concepts for experimental products should be arranged between centres developing such products. Periodic reports on the development of such products should be made available for review at the interim Workshop and by IPLAN, as arranged by the Secretariats.

5. Recruitment of observers

The regular procedures followed for the recruitment and training of observers and for liaison with ships of the Voluntary Observing Ships scheme of WMO and the Ships of Opportunity Programme of the IOC will be employed in this Pilot Project. Port Meteorological Officers (PMO's) should be given the necessary training to instruct ships' personnel involved in observing and reporting. National instructions will be needed for the implementation of this element of the Pilot Project.

IOC/WMO IGOSS MARINE POLLUTION MONITORING PILOT PROJECT

LOG FORM
FOR
OBSERVATION AND REPORTING OF OIL SLICKS AND OTHER FLOATING POLLUTANTS

(PLEASE REFER TO INSTRUCTION ON HOW TO COMPLETE THIS FORM)

MAY 1974

PLATFORM /SHIP			COUNTRY	INSTITUTE/ORGANIZATION	HEIGHT of OBSERVER ABOVE SEA LEVEL METERS
TYPE	NAME	CALL SIGN			

DATE/TIME GMT										QUAD	LAT.				LONG					OBSERVATIONAL CODES				DIMENSION (1/10 N. MILES)		OPTIONAL OBS.								REMARKS (DESCRIPTION OF POLLUTANTS, DURATION OF OBSERVATION ETC.)
																										WIND				WAVE				
DAY		MO.		YEAR		HR.		MIN.			DEG.		MIN.		DEG		MIN.							ALONG TRACK	ACROSS TRACK									
Y	Y	M	M	J	J	G	G	9	9	Q_c	L_a	L_a	L_a	L_a	L_o	L_o	L_o	L_o	L_o	A	B	C	D			UNIT	d	d	f	f	P_w	P_w	H_w	H_w	

PERSON/ORGANIZATION TO CONTACT FOR FURTHER INFORMATION ABOUT THIS REPORT

NAME _____ ADDRESS _____

Attachment

ATTACHMENT 1A

INSTRUCTIONS FOR COMPLETING THE FORM

1. Information should be entered on the form at least once per day on the following occasions:

   (a) Whenever oil or floating plastic wastes are observed, information should be entered using the code tables provided. Time and position should refer to the last point at which the pollutant was observed. In this case A = 2.

   (b) If no pollutants were observed during the last 24 hours, the ship's position at local noon should be reported entering 0 in the column for A.

   (c) If it has not been possible to observe pollutants due to high sea, bad visibility, navigation difficulties or other reasons during the preceding 24 hours, the ship's position at local noon should be reported entering 1 in the column for A.

2. Day and time should be reported in GMT.

3. The ship's position should be reported in degrees and minutes and the appropriate quadrant should be entered according to the table for Q_c.

4. Information about the pollutant should be given according to the Observational Code tables for B, C, and D, and the dimensions of the polluted area should be given in tenths of nautical miles along and across the ship's track, e.g. 2.8 n.m should be entered as 028. If it has not been possible to observe the width of the polluted area across the ship's track this should be reported by entering 999 in the last 3 columns.

5. If possible wind direction and speed should be reported. See Attachment 1B.

6. Wave height coded to the nearest half metre as described in the code form.

ATTACHMENT 1B

CODE TABLES WITH EXPLANATIONS

1. OBSERVATIONAL CODES[1]

A Status of observation

0 Sea surface observed during daylight of last 24 hours but no pollutants to report

1 Sea survace not observed during most of last 24 hours due to high sea, bad visibility or other reasons

2 Pollutants observed and reported.

B Type of pollutants

1 = Thin oil film

2 = Heavy oil layer

3 = Plastic materials

9 = Other (specify in remarks column).

C Configuration

1 = Continuous cover

2 = Patches

3 = In line or lines

D Concentration

The concentration should be reported in octas where 1 means the slightest presence of the reported pollutant, 4 that half of the surface is covered and 8 a continuous cover, as WMO code for ice coverage.

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1. To be used only in columns marked A, B, C, D on the Log Form for "Observation and Reporting of Oil Slicks and other Floating Pollutants."

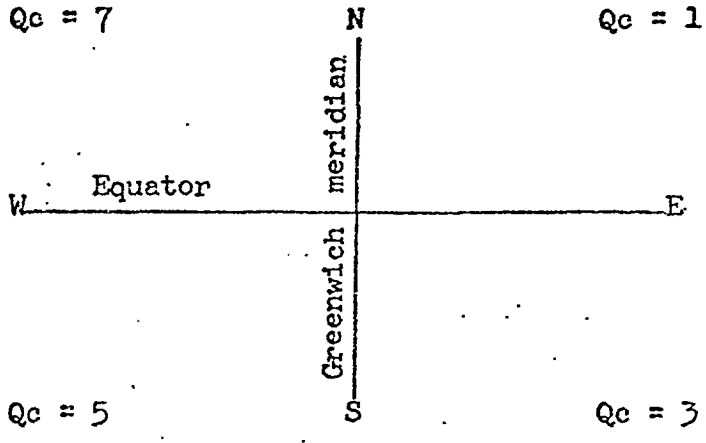
ATTACHMENT 1B (Continued)

2. Type of Platform

Code	Type Platform
1	Ship
2	Lightship
3	Buoy
4	Fixed Tower
5	Submersible
6	Aircraft
7	Ice Island
8	Fixed Coastal Station
9	Other

3. Quadrant of Globe (Q_c)

Code figure	Latitude	Longitude
1	North	East
3	South	East
5	South	West
7	North	West



Note: The choice is left to the observer in the following cases:

When the ship is on the Greenwich meridian or the 180th meridian (LoLoLoLo = 0000 or 1800 respectively):
Qc = 1 or 7 (northern hemisphere) or
Qc = 3 or 5 (southern hemisphere)

When the ship is on the Equator (LaLaLa = 000):
Qc = 1 or 3 (eastern longitude) or
Qc = 5 or 7 (western longitude)

ATTACHMENT 1B (Continued)

4. Wind Direction and Speed

   a. Wind speed units indicator (i_u)
   Enter "0" if speed in metres per second and "1" if speed in knots.[2]

   b. True wind direction(dd)
   Enter the true wind direction, in tens of degrees, from which the wind is blowing. Enter "00" for calm and "36" for a wind direction of 355° to 004°.

   c. True wind speed (ff)
   Enter true wind speed in metres per second or knots. Prefix zeros to fill the field. Enter "00" for calm.

5. Wave Period and Direction

   a. Wind Wave period (PwPw)
   Enter the average wind wave period to the nearest second. Prefix zeros to fill the field. Enter "00" for calm and "99" when the wind wave cannot be determined because the sea is confused. When the wind wave period cannot be determined for any other reason, enter two Solidi (//).

   b. Wind Wave height (HwHw)
   Report wave height to the nearest half meter according to the following WMO code:

   00 = calm
   01 = 1/2 meter
   02 = 1 meter
   03 = 1 1/2 meter
   04 = 2 meter
   05-99 = Increases at 1/2 meter intervals
   // = Wave height not determined

6. Air Temperature[3]

   a. Air temperature sign indicator (s_n)
   Enter "0" for positive temperatures and "1" for negative temperatures.

   b. Air temperature (TTT)
   Enter the air temperature to tenths of a degree Celsius. Prefix zeros to fill the field.

ATTACHMENT 1B (Continued)

7. Water Temperature[3]

a. Value - Sea surface temperature (TwTwTw)
Enter the temperature to tenths of a degree Celsius. To indicate negative temperatures, add 50.0 to the absolute value of the temperature and drop the negative sign. For example: -1.2°C would be encoded "51.2". If a thermometer, such as an engine-room intake, is read only to the nearest whole degree Celsius, this should be indicated in the tenths column by a Solidus (/). Prefix zeros to fill the field.

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[2]For Appendix II, Attachment 1 and Appendix IV, Attachment 1, omit unit indicator and enter wind speed in meters per second

[3]Code Tables 6 and 7 are for use with Appendix II, Attachment 1 and Appendix IV, Attachment 1

ATTACHMENT 1C

SUGGESTED EXPLANATORY NOTE TO BE PRINTED ON THE COVER OF PAD OF FORMS

THE PILOT PROJECT FOR MARINE POLLUTION MONITORING

The pollution of the atmosphere and land surfaces has become an increasing threat to human health. Pollution also affects the oceans and may be spread over vast areas.

Being aware of the importance of this problem, the United Nations has instructed relevant bodies to make an attempt to map and monitor the pollution in the world's oceans. The World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC) have therefore decided, through their joint programme called the Integrated Global Ocean Station System (IGOSS), to initiate a pilot programme for marine pollution monitoring.

One of the objectives of the pilot project is to obtain, through visual observations of oil slicks and other floating pollutants, an appraisal of the quantity of the distribution of these pollutants over certain ocean areas and the manner in which the pollutants are transported and dispersed.

Area of the project

As outlined in item 3 of the Plan.

Period of the project

The project will start on 1 January 1975 and continue for 24 months

When should the observations be made ?

It is desirable that a continuous watch be kept when operating in any of the areas mentioned above. As soon as oil or plastic materials in any significant quantities are observed this should be entered in the log form. It is also important to know when no pollutants have been observed and this can be reported by entering the ship's position at local noon with an indication that no pollutants have been observed.

What to do with the completed forms ?

Fold as indicated on the form and mail to the address provided by the National Coordinator.

THANK YOU VERY MUCH FOR YOUR PARTICIPATION IN THIS IMPORTANT PROJECT

APPENDIX II

PROCEDURES FOR THE SAMPLING AND REPORTING OF PARTICULATE PETROLEUM RESIDUES (TAR BALLS)

1. Sampling

The method to be used employs a Neuston net as described by SAMEOTO and JAROSZYNSKI (J. Fish. RES. BD, Canada 25, 2240, 1969). These nets (mesh size 243 or similar) are light, easy to operate, and may be towed off the side of the ship in any but rough sea conditions. The net should be towed at speeds that permit the sampler to ride smoothly on the surface for 1 nautical mile. From ships under way samples should be collected daily if possible. At fixed locations, sampling should be done on a monthly basis. Samples should be taken day or night recognizing that daytime sampling will reduce the amount of organisms collected.

2. Sampling procedure

(i) The sampler is rigged so that it will go off to the side of the ship and pass through a surface that has not been greatly distributed by the ship. (Bridles must be attached to the side of the sampler nearest the ship). It may be necessary to adjust the relative lengths of the upper and lower bridles, depending on the elevation of the towing point on the ship, so that the sampler rides smoothly.

(ii) Check attachment to towing cable and the latches holding wings. Fasten PVC sample container to end of net.

(iii) Tow from a point well forward on the ship, preferably from a boom. Where possible, tow the net on the lee side and avoid heading into the wind in order to avoid towing along or between windrows.

(iv) At completion of tow, retrieve sampler, wash contents of net into PVC sample container. Place contents into glass jar, label and place in freezer if possible. If the net contains an undue amount of extraneous material it should be emptied into a clean bucket containing water and the tar balls recovered.

(v) Record location, time, and sea conditions and other pertinent information on the log sheet.

(vi) If fresh sticky oil adheres to net, wash with varsol or similar solvent and retain the washings in a labeled jar.

3. Preservation of the sample

Freezing of samples is recommended, otherwise refrigerate.

4. Recording of samples

The log specified in Attachment 1 to this Appendix should be filled in.

A label specified in Attachment 2 to this Appendix should be completed and attached to the sample jar.

5. Dispatch of samples

Sample jars, together with the log, should be packed securely in the transit case provided and sent to the appropriate analysis laboratory as specified by the National Coordinator.

6. Analysis procedures

Quantitative estimation of petroleum-derived material

(a) If the tar balls have been separated manually, they may be weighed directly. However, this weight may include inorganic materials such as sand or bits of shells and any water contained in the tar balls. A more reliable estimate may be obtained by proceeding as outlined in (b) below.

(b) If it is not possible to separate the tar balls manually from extraneous material, proceed as outlined below.

(i) dissolve the tar balls in carbon tetrachloride.

(ii) Recover the carbon tetrachloride extract and evaporate to dryness. (This may be hastened by mild heating, but actual boiling should be avoided as there will be some loss of volatile components).

(iii) Weigh the residue and complete the log (enter weighing).
(iv) Concentration of Tar (see Note B below).

7. Forewarding of completed log forms

The completed log forms should be forewarded as advised by the National Coordinator. Please also prepare and forward a copy of the IOC "ROSCOP II" Inventory Form upon completion of cruise.

8. Areas for monitoring

As outlined in item 3 of the Plan.

NOTE A: Code Tables for use with Attachment 1 can be found in Appendix 1, Attachment 1B.

NOTE B: It is also desirable to calculate the "Tar Concentration" (Total weight of Tar/Area swept by sampling net).

IOC/WMO IGOSS MARINE POLLUTION MONITORING PILOT PROJECT

LOG FORM
FOR
SAMPLING AND REPORTING PARTICULATE PETROLEUM RESIDUES (TAR BALLS)

(PLEASE REFER TO INSTRUCTIONS FOR COMPLETING THIS LOG)

PLATFORM/ SHIP			COUNTRY	INSTITUTE	CRUISE NO*	SAMPLING DEVICE	MESH SIZE
TYPE	NAME *	CALL SIGN*					

STATION NUMBER	SAMPLE NUMBER* (1)	WIDTH OF NET (CM)	DISTANCE TOWED (N. MILES)	TO BE FILLED IN BY LABORATORY		DATE* (GMT)			TIME* (GMT)		POSITION *								OPTIONAL ENVIRONMENTAL INFORMATION																	
				WEIGHT OF TAR (g)	TAR CONC. (mg/m^2)	DAY	MO.	YR.	HR.	MIN.	QUAD	LAT.		LONG.						WIND		WAVE			TEMP. °C											
												DEG.	MIN.	DEG.	MIN.					DIR.	SP.	PER	HT.		AIR				WATER							
						Y Y	M M	J J	G G	q q	Q_c	L_a L_a	L_a L_a	L_o L_o	L_o L_o					d d	f_f f_f	P_w P_w	H_w H_w	S_N	T	T	T	T_w	T_w	T_w						

NAME OF PERSON/OFFICE TO CONTACT FOR FURTHER INFORMATION CONCERNING THIS REPORT.

NAME: ADDRESS:

* NOTE – INCLUDE ITEMS MARKED WITH AN ASTERISK ON BOTTLE LABEL (IF USED)

(1) MARK SAMPLE NUMBER ON BOTH SAMPLE BOTTLE AND BOTTLE CAP

Attachment 2

LABEL FOR SAMPLE BOTTLE FOR PARTICULATE PETROLEUM RESIDUES (TAR BALLS)

Label of sample bottle

CRUISE_____ PLATFORM/SHIP (Name and Call Sign)_____

DATE/TIME (GMT)_____ SAMPLE NO._____

LAT_____

LONG_____

COMMENTS_____

APPENDIX III[1]

TAR SAMPLING ON BEACHES

Selection of Area

1. Minimum of human activity;

2. No local sources of petroleum pollution;

3. Uniformity of shoreline (no breakwaters or cuts);

4. Sandy beach;

5. Gentle slope should be present but not so as to make distance from high to low tide mark too large for practical sampling.

Size of Sampling Zone

An area 6 meters (20 linear feet) along the beach and from backshore to low tide mark across the beach.

Frequency of Sampling

Every 9th and 10th days - In this way the 9th day sampling will represent 9 days of tar accumulation and the 10th day samplings will represent one day of tar accumulations.

Duration

One year, to commence at anytime of the year.

Number of Samplings

Two sets - 35 samplings each (one set of 35 day 9; one set of 35 day 10).

Sampling Procedure

Stake out area. Clean off all debris from backshore to waterline prior to sampling. Sample only at or near time of low tide. Pick up all visible solid and semi-solid pieces of tar oil on surface of beach only. Weigh and record[2] recoveries.

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[1] This Appendix should be reviewed by experts prior to issuance as program guidelines.

[2] A draft recording form with coding instructions and explanation notes is attached. (Attachment 1)

Beach tar Monitoring Program Log

Location	Date	Recorder	Time of low tide (local time)	Time of collection (local time)	Wind direction	Sea state or wave height	Weight of collected tar (GM.) sandy[1]	non-sandy[2]	coquina[3]	total	Remarks

[1] nearly free of sand

[2] coated with sand and may contain entrained sand

[3] very hard and brittle and may contain abraded shell fragments

Attachment 1.

APPENDIX IV

PROCEDURES FOR SAMPLING AND REPORTING PETROLEUM HYDROCARBONS DISSOLVED AND DISPERSED IN SEA WATER

Sampling

50 ml of hydrocarbon-free carbon tetrachloride[1] are placed in a clean[2] brown-glass bottle (3-4 litres). The bottle is sealed with a screw cap lined with degreased tin foil. This preparation should be carried out by the participating laboratory prior to the field work. Immediately before samples are taken, the bottle is placed in the weighted holder as illustrated below and the cap removed.

While the ship is still moving slowly forward, the assembly is thrown overboard from the bow and as far as possible away from the ship. The bottle will immediately sink and fill with water. Upon retrieval, some water is spilled (sufficient to allow for possible thermal expansion) out of the bottle. The cap is securely fastened and the bottle stored away.

Caution: Throughout the procedure, great care must be taken to avoid contamination.
NOTE: Diagram to accompany final version[3]

Frequency of sampling

Where possible, samples should be taken daily from ships in transit. From permanent stations, including Ocean Weather Ships, sampling should be done on a bi-weekly basis.

Sample Preservation

As carbon tetrachloride is an effective bacteriostat, further preservation of the samples is not necessary.

Recording of Samples

A log must be maintained (Attachment 1 to this Appendix) to identify the samples, noting the position, date and time. Specified environmental data should also be given when possible. (See Notes A, B, and C.)

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1 or an appropriate amount of other suitable solvents; Care should be exercised in the use and handling of carbon tetrachloride.

2 hydrocarbon-free as determined by blanks.

3 see the Report of the Workshop on Marine Pollution Monitoring.

A label (format specified in Attachment 2) should be attached to the sample bottle bearing the sample number from the log and the position, date and time of the sample.

Dispatch of Samples

Sample bottles, together with the logs, should be packed securely in the transit case provided (to be determined nationally) and sent to the appropriate analysis laboratory.

Processing and analysis of sample

After shaking the water, CCl_4 mixture, allow the two phases to separate, pipet off the CCl_4[3] and place it in a clean glass bottle.

Add 50 ml hydrocarbon-free CCl_4 to the seawater, carry out a second extraction and add CCl_4 to the previous 50 ml.

Evaporate CCl_4 in a rotary evaporator or with mild heating on a hot place (do not boil).

Prepare quantitative extract in n-hexane (5 ml clean volumetric flask).

Transfer to a 1 cm silica cell for fluorescence maxima in the neighborhood of 310 and 360 nanometer, respectively. (The optimum wavelength for excitation and emission should be selected.)

The intensity of the fluorescence is measured and compared with a series of standard solutions[4] of similar composition and concentration under identical instrumental conditions.

Finally, measure the volume of sea water processed and calculate the concentration of oil present in the water.

Ref: Levy, Water Research, 5, 723 (1971)

Handling of Data

Data obtained from the analysis of water samples should be recorded on the Log (Attachment 1) and the forms submitted through national channels as established by the National Coordinator, to the IGOSS "Responsible National Oceanographic Data Centers" (RNODC's). The analysis laboratory is also requested to prepare and submit, along with the Log (Attachment 1), a Data Documentation Form containing the information shown in Attachment 3 to this Appendix.

---

[3] Care should be exercised in the use and handling of CCl_4.
[4] API Reference crude oil (medium aromatic content) is recommended as standard.

NOTE A: Code Tables for use with Attachment 1 can be found in Appendix I, Attachment 1B.

NOTE B: If samples are collected and analyzed from depths greater than the upper 1 meter, please enter depth of sampling in the "Remarks " space of Attachment 1 and use Attachment 3 to document methods used for sampling and analysis.

NOTE C: Immediately upon completion of a cruise, please prepare and submit the IOC "ROSCOP II" Inventory Form.

IOC/WMO IGOSS MARINE POLLUTION MONITORING PILOT PROJECT

LOG FORM FOR SAMPLING, ANALYSIS AND REPORTING DISSOLVED/DISPERSED HYDROCARBONS (1)

(PLEASE REFER TO INSTRUCTIONS FOR COMPLETING THIS LOG)

PLATFORM/SHIP			COUNTRY	INSTITUTE	CRUISE NUMBER*
TYPE	NAME*	CALL SIGN*			

STATION NUMBER	SAMPLE NUMBER*	CONCENTRATION (2) ug/kg	DATE* (GMT)			TIME* (GMT)		QUAD	POSITION*				OPTIONAL ENVIRONMENTAL INFORMATION								REMARKS
			DAY	MO.	YR.	HR.	MIN.		LAT.		LONG.		WIND		WAVE		TEMP °C				
									DEG.	MIN.	DEG.	MIN.	DIR.	SP.	PER.	HT.	AIR		WATER		
			YY	MM	JJ	GG	qq	Q_c	L_aL_a	L_aL_a	L_oL_o	L_oL_o	dd	ff	P_wP_w	H_wH_w	S_N TTT		$T_wT_wT_w$		

NAME OF PERSON/OFFICE TO CONTACT FOR FURTHER INFORMATION CONCERNING THIS REPORT.
NAME: _____ ADDRESS: _____

* NOTE – INCLUDE ITEMS MARKED WITH AN ASTERISK ON BOTTLE LABEL (IF USED)
(1) THIS FORM SHOULD BE ACCOMPANIED BY A DATA DOCUMENTION FORM
(2) CONCENTRATION TO BE DETERMINED BY CHEMICAL ANALYSIS CENTER

LABEL OF SAMPLE BOTTLE FOR DISSOLVED/DISPERSED PETROLEUM HYDROCARBONS

Label of Sample Bottle

CRUISE _____ PLATFORM/SHIP (Name and Call Sign) _____

DATE/Time .. (GMT) _____ SAMPLE No. _____

LAT _____

LONG _____

COMMENTS _____

Attachment 2

IOC/WMO IGOSS MARINE POLLUTION MONITORING PILOT PROJECT

DATA DOCUMENTATION FORM (FOR USE WITH LOG FORM FOR SAMPLING, ANALYSIS AND REPORTING DISSOLVED/DISPERSED HYDROCARBONS)

(TO BE PREPARED BY ANALYZING LABORATORY)

PLATFORM/SHIP			COUNTRY	INSTITUTE	CRUISE NUMBER
TYPE	NAME	CALL SIGN			

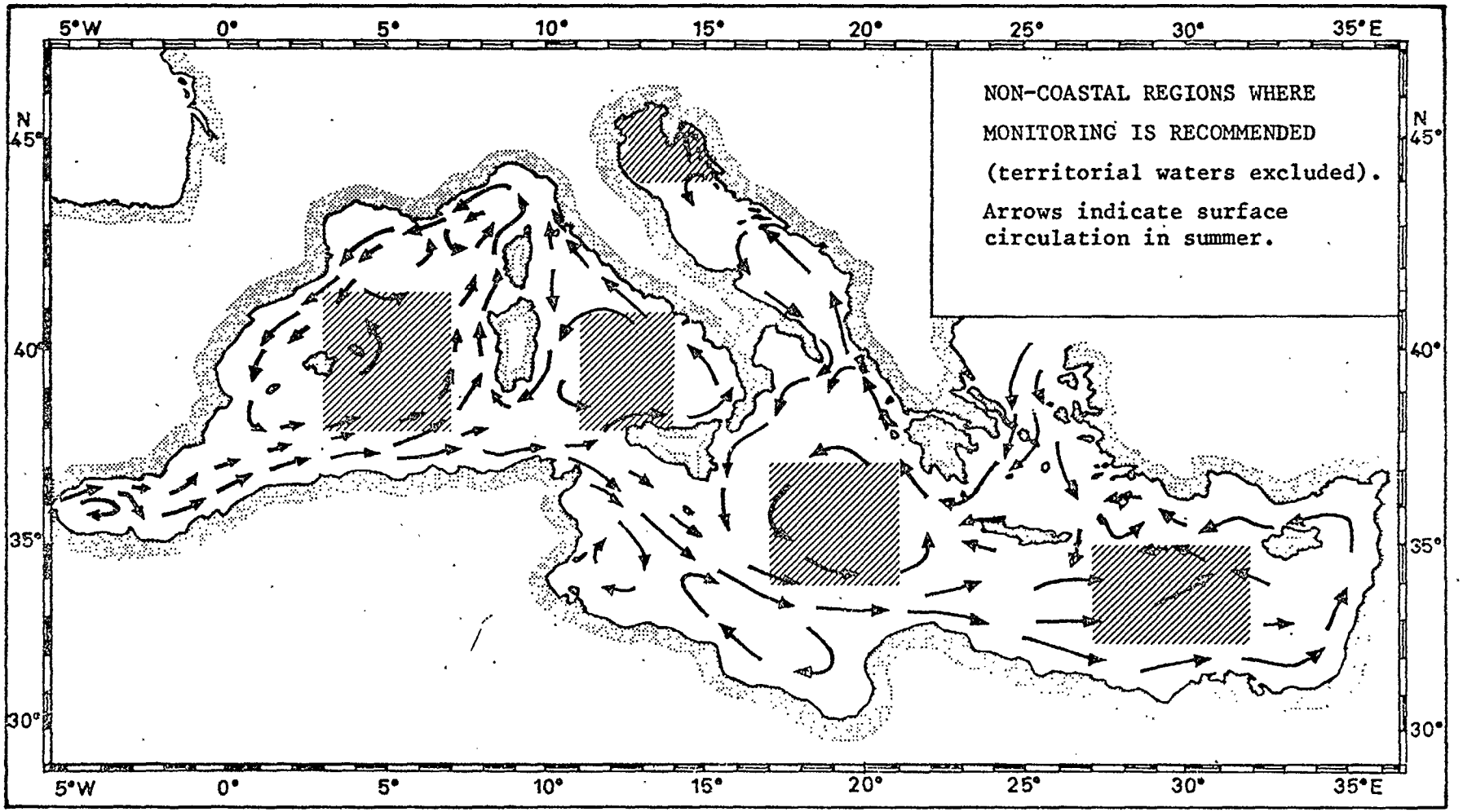
STATION NUMBER		SAMPLE NUMBER		COLLECTION TECHNIQUE AND SAMPLING EQUIPMENT (1)	IDENTIFICATION OF STANDARDS (2)	ANALYTICAL METHODS AND IDENTIFICATION OF INSTRUMENTATION (3)
FROM	TO	FROM	TO			

ADDITIONAL (OPTIONAL) DOCUMENTATION

FILTERED/UNFILTERED (CIRCLE ONE) _____ DATE (S) OF SAMPLE ANALYSIS _____
FILTER SPECIFICATIONS _____ SAMPLE APLIT _____
TYPE OF SAMPLE BOTTLE _____ EXTRACTION PROCEDURE _____
FIXING AGENTS _____ SAMPLE PURIFICATION _____
SAMPLE OF FROZEN/REFRIGERATED/AMBIENT (CIRCLE ONE) ___ ESTIMATED ACCURACY OF METHOD ___
DURATION OF SAMPLE STORAGE _____ OTHER (USE REVERSE) _____

NOTE:

(1) eg. PLASTIC BUCKET, GLASS JAR, SHIP'S INTAKE
(2) THE OIL USED TO CALIBRATE THE INSTRUMENTATION OR METHOD.
(3) NARRATIVE DESCRIPTION, WITH EMPHASIS ON DIFFERENCES (IF ANY) FROM THE TECHNIQUES RECOMMENDED BY THE PILOT PROJECT OPERATIONAL PLAN, 1974



From : Proceedings of the Inter-Parliamentary Conference of Coastal States on the Control of Pollution in the Mediterranean Sea, FAO, Rome, 29/3-3/4 1974. Rome, 1974.

PROCEDURES FOR SAMPLING AND REPORTING PETROLEUM HYDROCARBONS DISSOLVED AND DISPERSED IN SEA WATER

Co-Chairmen: Drs. E. Levy and M. Ehrhardt
Rapporteur : Dr. A. Zsolnay

Sampling

It has been agreed that, in the initial stage of the Pilot Project, water samples would be collected from one meter depths. Uncontaminated water samples are readily collected by the following method:

50 ml of hydrocarbon-free carbon tetrachloride[1] are placed in a clean[2] brown-glass bottle (3-4 litres). The bottle is sealed with a screw cap lined with degreased tin foil. This preparation should be carried out by the participating laboratory prior to the field work. Immediately before samples are taken, the bottle, with cap removed, is placed in the weighted holder (cf. Fig. 1).

While the ship is still moving slowly forward, the assembly is thrown overboard from the bow and as far as possible away from the ship. The bottle will immediately sink and fill with water. Upon retrieval, some water is spilled (sufficient to allow for possible thermal expansion) out of the bottle. The cap is securely fastened and the bottle stored away.

Caution: Throughout the procedure, great care must be taken to avoid contamination.

Frequency of sampling

Where possible, samples should be taken daily from ships in transit. From permanent stations, including Ocean Weather Ships, sampling should be done on a bi-weekly basis.

Recommendations

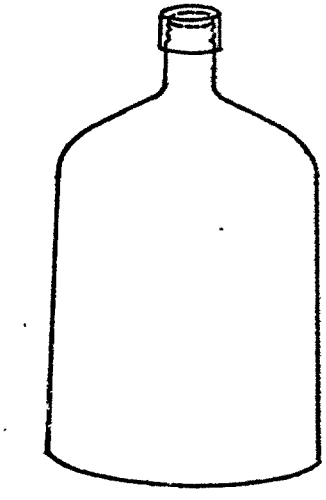
Recognizing that the immediate surface might be more important with respect to environmental processes, it is recommended that appropriate methods will be developed to sample surface films.

Recognizing that suitable procedures to collect water samples for low level hydrocarbon analyses from greater depths are not yet fully adequate, it is recommended that suitable sampling devices and procedures be developed.

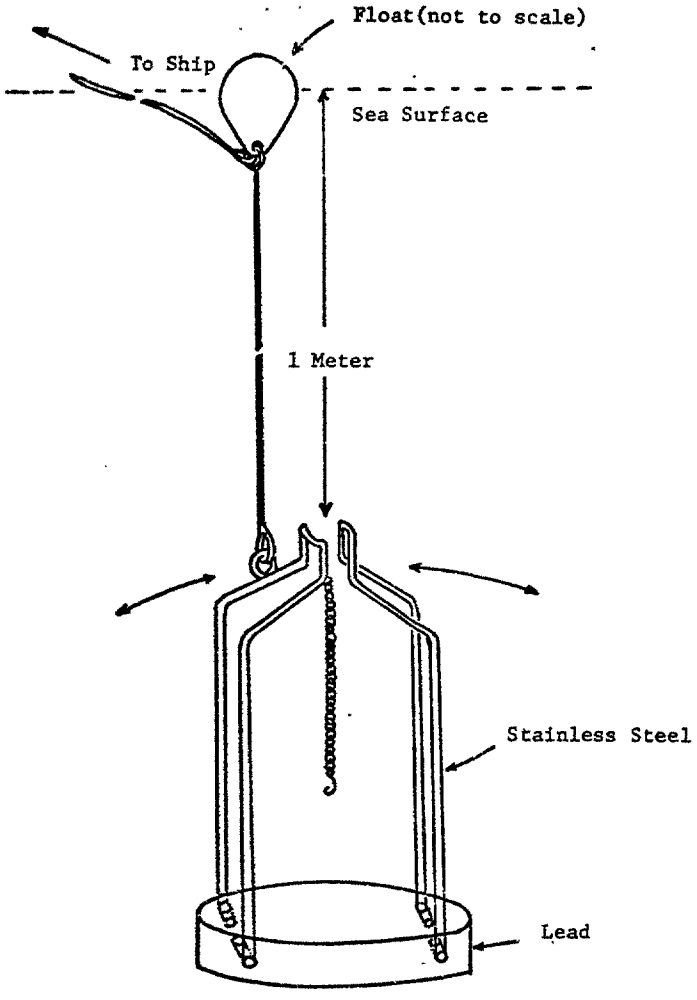
---

[1] or an appropriate amount of other suitable solvents; car should be exercised in the use and handling of carbon tetrachloride.

[2] hydrocarbon-free as determined by blanks



Sample Bottle with Cap



Bottle Holder with Floatation Unit

Figure 1.

DISSOLVED HYDROCARBON SAMPLING DEVICE

When taking a sample, the bottle cap is removed, the bottle is placed in the holder by swinging open the stainless steel cage, and the bottle is secured within the cage. The assembly is then thrown overboard from the bow, away from the ship but held by a retrieving line. After the bottle sinks and the sample is obtained, the bottle is hauled in, some water is spilled out of the bottle (to allow for possible thermal expansion), the cap is fastened and the bottle is labelled and stored away.

It is further recommended that methods be developed to collect samples from ships other than research vessels without interfering with their normal operations. For example, cartridges containing suitable absorbents may be placed in a by-pass to the sea water intake.

Sample Preservation

As carbon tetrachloride is an effective bacteriostat, further preservation of the samples is not necessary.

Recording of Samples

A log must be maintained to identify the samples, noting the position, date and time. Specified environmental data should also be given when possible. The Workshop suggested some modifications to the format(s) as given in the Operational Plan for the Pilot Project and recommended that the Joint Task Team refine the reporting forms and include these incorporations in the final version of the Operational Plan for the Pilot Project.

A label should be attached to the sample bottle bearing the sample number from the log and the position, date and time of the sample. This was to be designed by the Task Team for inclusion in the Operational Plan for the Pilot Project.

Dispatch of Samples

Sample bottles, together with the logs, should be packed securely in the transit case provided (to be determined nationally) and sent to the appropriate analysis laboratory.

Analysis Procedure

The Workshop decided to focus the quantitative analyses on aromatic hydrocarbons because:

(1) They are considered to have the greatest environmental impact in terms of toxicity;

(2) They seem to offer a means to differentiate between biogenic and petroleum derived hydrocarbons;

(3) Relatively straightforward and sensitive analytical methods exist for their estimation.

It is recommended, therefore, to use fluorescence spectrophotometry for quantitative measurements as described below:

Processing and analysis of samples

After shaking the water-CCl_4 mixture, allow the two phases to separate, pipet off the CCl_4[3] and place it in a clean glass bottle.

[3] Caution must be exercised in the use and handling of CCl_4.

Add 50 ml hydrocarbon-free CCl_4 to the seawater, carry out a second extraction and add CCl_4 to the previous 50 ml. Measure the volume of seawater processed.

Evaporate CCl_4 in a rotary evaporator or with mild heating on a hot plate (do not boil).

Prepare quantitative extract in n-hexane (5 ml clean volumetric flask).

Transfer to a 1 cm silica cell for fluorescence spectrophotometry.

Scan both excitation and fluorescence spectra. (Crude and residual fuel oils have excitation and fluorescence maxima in the neighborhood of 310 and 360 nanometer, respectively. The optimum wavelength for excitation and emission should be selected.)

The intensity of the fluorescence is measured and compared with a series of standard solutions[4] of similar composition and concentration under identical instrumental conditions.

Finally, calculate the concentration of oil present in water.

Ref: E. M. Levy, Water Research, 5, 723 (1971)

Alternative Methods

UV-absorption spectrophotometric measurement after column chromatographic clean-up and concentration (A. Zsolnay, Chemosphere, 6, 253-260, 1973).

Other analytical methods such as gas chromatography are not meant to be excluded. Indeed, gas chromatography provides much more information on the composition of samples, but it is not sufficiently sensitive for the concentrations expected to be encountered in other than highly polluted sea areas.

It is recommended that research be undertaken to develop and/or assess simple, fast, reliable and inexpensive methods for future stages of the Pilot Project.

Handling of Data

Data obtained from the analysis of water samples should be recorded on forms as developed by the Task Team for inclusion in the Operational Plan and the forms submitted through national channels as established by the National Coordinator, to the IGOSS "Responsible National Oceanographic Data Centers" (RNODC's). The WC IODE's ad hoc Group on IGOSS Data Archiving and Exchange, in conjunction with the ad hoc Group on Marine Pollution Data and the ad hoc Group on Format Development, should be instructed to prepare a supplement to the IGOSS Manual on Data Archiving and Exchange, outlining marine pollution data archival arrangements.

[4] API Reference crude oil (medium aromatic content) is recommended as standard.

Recommended Procedure for Analyses of Tar Balls

The panel recommended the following procedure for analysing tar balls, especially if it is not possible to separate the tar balls manually from extraneous material:

(a)

(i) dissolve the tar balls in carbon tetrachloride;

(ii) recover the carbon tetrachloride extract and evaporate to dryness. (This may be hastened by mild heating, but boiling should be avoided as there will be some loss of volatile components);

(iii) weigh the residue and enter the weight in the log book;

(iv) determine concentration of tar per unit area or volume of beach or seawater.

(b) If the tar balls have been separated manually, they may be weighed directly. However, this weight may include inorganic materials such as sand or bits of shells and any water contained in the tar balls.

IOC/UNEP

Joint Co-ordinated Pilot Project on Problems of Coastal Transport of Pollutants

OPERATIONAL DOCUMENT

Malta, September 1975

CONTENTS

page

1. General Introduction 3
2. Objective of the Pilot Project. 3
3. Outline of the Pilot Project 3
4. Programme of Work 4
   4.1 Areas of Investigation. 4
   4.2 Basic Parameters. 5
   4.3 Complementary Data 5
   4.4 Observation and Methodology 5
   4.5 Stations 6
   4.6 Frequency of Observations. 6
   4.7 Depths of Observations. 6
   4.8 Data collection and Processing 6
5. Participants in the Pilot Projects 7
6. Requirements for Instruments and Maintenance Services 7
7. Intercalibration of instruments 7
8. Training Needs and Technical Assistance. 7
9. Co-ordinating Activities. 8
10. Reports 8
11. Programme Timing 9

1. General Introduction

Under the joint auspices of the Intergovernmental Oceanographic Commission (IOC), the General Fisheries Council for the Mediterranean (GFCM, of FAO) and the International Commission for the Scientific Exploration of the Mediterranean (ICSEM); the United Nations Environment Programme (UNEP) supported an International Workshop on Marine Pollution in the Mediterranean (Monaco, 9-17 September 1974). The Workshop defined the pollution of coastal waters as the main problem in the Mediterranean and attributed it to the general lack of adequate systems for the treatment and disposal of domestic and industrial waste, to the input of petroleum hydrocarbons and organochlorines, and to the presence of pathogenic micro-organisms. The Workshop reviewed the available information on current regional programmes as well as on the research and monitoring facilities in the Mediterranean, and outlined several pollution monitoring and research pilot projects for the Mediterranean.

At the UNEP Intergovernmental Meeting on the Protection of the Mediterranean, which was held in Barcelona from 28 January to 4 February 1975 seven pilot projects outlined by the Monaco Workshop were endorsed as parts of a Co-ordinated Mediterranean Pollution Monitoring and Research Programme whose early implementation was recommended in the frame of the adopted Mediterranean Action Plan.

A joint IOC/WMO/UNEP consultation was held in Malta (8-13 September 1975) to implement two of the endorsed pilot projects:

baseline studies and monitoring of oil and petroleum hydrocarbons in marine waters, and

coastal transport problems of pollutants.

Experts of the countries bordering the Mediterranean proper and several experts outside the region were invited in order to discuss the two pilot projects and prepare its operational document which will serve as the frame for the co-operation of the Mediterranean research centres in the two pilot projects. The consultation was convened as part of the Mediterranean Action Plan adopted by the UNEP Intergovernmental Meeting on the Protection of the Mediterranean.

2. Objective of the Pilot Project

The main objective of this pilot project will be the investigation of water circulation in coastal areas and exchange of water between the coastal and offshore regions, in order to provide the necessary information on the physical processes contributing to the transport of pollutants in the Mediterranean Sea.

3. Outline of the Pilot Project

Pollutants, either in a dissolved or in a particulate state, are discharged into the sea by the following routes:

through river discharge;

through direct terrestrial run-off (e.g. urban or industrial wastes);

by dumping or discharge from ships;

from the atmosphere.

They are distributed in the sea under the influence of hydrodynamic conditions existing near each source and in surrounding areas and in particular by two main physical processes:

horizontal advection;

turbulent mixing.

Therefore, in order to understand their actual distribution and to predict the effect of potential sources of pollutants, a sound knowledge of the water circulation and eddy diffusion is required. Since the gross features of the general current system in the Mediterranean are relatively well known, the pilot project will be directed to the investigation of water circulation in coastal areas and exchange of water between the coastal and off-shore regions, especially in those areas where present or future pollutant discharge may be of importance, as for example at river mouths or urban concentrations.

Such investigations should be made during all seasons and especially under those meteorological conditions that are characteristic of the area, without neglecting small scale fluctuations.

4. Programme of Work

4.1 Areas of Investigation

The pilot project should commence with studies in areas selected by the participating institutions. It should be noted, however, that not only areas already polluted should be studied but also those still free from pollution. Selected areas might be located near large cities or important rivers such as:

Areas of Investigation	Cities	Rivers
The Mediterranean coasts of Maghreb, including the Strait of Gibraltar	Oran Algiers Tunis	
The eastern Mediterranean coast	Tripoli Benghazi Alexandria Port-Saïd Tel-Aviv Haifa Beirut Mersin	Nile
The coasts and islands of Greece	Thessaloniki Athens-Piraeus Volos Kavala	
The western coasts of Turkey	Izmir	(Dardanelles)
The northern Adriatic	Rijeka Trieste Venezia	Po
The Tyrrhenian and Ligurian Seas	Palermo Naples Rome Livorno Genoa	Tiber

Areas of Investigation	Cities	Rivers
The south coast of France	Marseilles	Rhone
The east coast of Spain	Barcelona Valencia Alicante Malaga	Ebro

4.2 Basic Parameters

Noting the influence that coastal and bottom morphology, as well as regional and local wind fields acting on the sea surface, has on coastal circulation, the basic parameters to be studied are:

currents;

salinity and temperature;

surface wind;

bathymetry (sea depth).

Also, collection of existing data or direct measurements of main river discharges at regular intervals should be made.

4.3 Complementary Data

Meteorological data;

transparency and turbidity;

sea level

chemical, biological, and geological studies may also be used to supplement the basic data.

4.4 Observation and Methodology

It is noted that many laboratories, especially those in developing countries, may not, at present, be well equipped to make these measurements. The most convenient method should be used by each laboratory bearing in mind that different methods yield different information and that, in general, a higher level of sophistication yields better data (but also requires more training).

(a) Current measurements

The following techniques may be used:

drift cards or drifters;

drogues;

tracers or dyes;

current meters, preferably recording.

It is suggested that the methods using drift cards might be adopted by all laboratories such that results may be co-ordinated and compared.

Since results obtained from current meters yield different data from those obtained by drift cards or drogues, both methods should be used as far as possible.

(b) Salinity and temperature

Salinity and temperature should be determined by the classical methods or by in situ measurements using STD probes.

Temperature may also be measured using bathythermographs or thermistor chains.

(c) Surface winds

On board vessels, hand or recording anemometers can be used. Also the help of coastal meteorological stations will often be of value in determining this parameter.

Information on the general meteorological situation can be obtained through the meteorological services.

(d) Complementary data

These should be collected depending on local conditions and capabilities following recognized methods.

4.5 Ocean Data Stations

A network of Ocean Data Stations should be selected to cover the area of study. The number and position of the Stations should be based on either previous experience or a preliminary survey.

4.6 Frequency of Observations

Observations should be carried out during all seasons and under different meteorological conditions. In deciding on the periods for observations, local and regional conditions should be considered.

4.7 Depths of Observations

(a) Current measurements

These should be conducted at least in the surface mixed layer, below the thermocline, if this exists, and near the bottom.

(b) Salinity and temperature

These should be either as a continuous function of depth or at discrete depths. In the latter case these depths should include at least the standard depths for data comparison and handling.

4.8 Data Collection and Processing

While the number of observations taken cannot be accurately assessed since it depends on the number, scope and state of development of the various national programmes, it can be reckoned that in the case of each institution this number will not exceed processing and handling capacity.

However, to ensure that the pilot project is true to its purpose of comprehensive study of the factors governing transport of coastal pollution throughout the Mediterranean, provision must be made for the storage of data obtained so that they can be more readily exchanged and recorded in national, regional and world data centres.

Participating countries are therefore required to apply strictly the rules laid down by the IOC Working Committee on International Oceanographic Data Exchange.

Compliance with these rules will offer the additional advantage of making it possible in certain instances to use the computerized facilities of some centres to ensure optimum processing of raw data. The opportunity could also be taken of using the centres to train the personnel concerned by application of these techniques.

Finally, consideration might be given to commissioning one or more such centres to produce condensed reports deemed of use in following the development of the project.

5. Participants in the Pilot Project

A number of Mediterranean research centres have expressed the wish to participate in the pilot project. These were identified through inquiries by the Secretariat of IOC and during a feasibility study on the execution of the Co-ordinated Mediterranean Monitoring and Research Programme carried out by two IOC consultants on behalf of UNEP.

The participation will not be limited to research centres able to deal with all aspects of the proposed working programme, but may also include those research centres which are capable of only limited contributions initially, whilst under development. Research centres may join the project at any time they wish. However, their participation, as well as the programmes they are proposing as their contribution, will have to be cleared by their relevant national authorities.

6. Requirements for Instruments and Maintenance Services

To improve the facilities of the participating research centres various additional instruments will be provided through the pilot project.

Maintenance and advisory services will be organized through the pilot project for the more complex instruments used in the project. The selection of the instruments for the pilot project will be based on their performances, and the maintenance services which could be organized for their smooth operation.

The selection of the recipient centres will be based on an assessment of the most acute needs for such facilities, and the assurance of the recipients to provide adequate infrastructure for their installation, routine maintenance, calibration and operation in accordance with the needs of the programme.

7. Intercalibration of Instruments

Intercalibration of instruments will not in general be necessary but may be desirable in certain cases (e.g. when field work is carried out in neighbouring coastal areas by different institutions).

8. Training Needs and Technical Assistance

The lack of adequately trained scientists to perform the sophisticated techniques seriously hinders the full participation of all national research centres which expressed the wish to become part of the project participating in the execution of the programme. Therefore, fellowships for in-service training of up to six months each will be awarded with priority to those research centres of the developing countries whose full participation in the pilot projects depends on formation of adequately trained scientists. The fellowships will be available at the very beginning of the programme.

The training, including on-board training, will be executed in Mediterranean research centres, having adequate facilities and experience in such activity.

Trainees will be selected from national research centres which provide an assurance that the trainee will continue to work on the programme upon return to his home centre. The training centres shall, after return home of the trainees, continue to maintain regular contact.

9. Co-ordinating Activities

Co-ordination of the work performed by the participating institutions on the basis of this Operational Document will be done by IOC and UNEP. This may include:

correspondence with the national authorities and the participating research centres;

co-ordination of field work in neighbouring coastal areas or regions;

co-ordination of large-scale drift card experiments and of their evaluation;

issuance to participants of a regular Newsletter giving the progress of field experience, and general results of the participating institutions;

a contact group meeting in each year of the project;

organization of data reporting, evaluation and dissemination;

organization of the training programme;

organization of the delivery of equipment;

organization of assistance with maintenance;

constant review of participating research centres and efforts to enlarge the network of participants;

contacts with similar projects;

co-ordination of the visits of experts;

any other activity relevant to the execution of the programme.

The activities envisaged in the frame of this pilot project will be co-ordinated with the activities of other pilot projects in the frame of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme endorsed by the Barcelona Intergovernmental Meeting on the Protection of the Mediterranean.

10. Reports

A mid-term and final report will be prepared 12 and 24 months after the pilot project becomes operational. In addition progress reports will be prepared six and eighteen months after the beginning of the pilot project operational phase.

11. Programme Timing

The total duration of the operational phase of the programme will be two years, starting on 1 January 1976.

Since there is likely to be a variety of national contributions and some countries will be unable to initiate action on the scheduled date, it is not possible to provide a precise general time-table.

As a rough guide, the following tentative time-table is proposed:

	1975	1976												1977												1978		
	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
1. Preparatory phase	x	x	x	x	x																								
2. Training			x	x	x	x	x	x	x	x	x	x	x	x															
3. Delivery of equipment			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x											
4. Intercalibration trials			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
5. Taking of measurements			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
6. Visits of experts				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
7. Data analysis								x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
8. Meeting (mid-term and final																	x												x
9. Report								x							x						x						x		

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* participated in panel on petroleum monitoring.
** participated in panel on coastal transport of pollutants.

II. Other Invited Experts/Autres Experts Invités

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III. Intergovernmental Organizations/ Organisations intergouvernementales

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IV. Secretariat/Sécrétariat

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