Intergovernmental Oceanographic Commission

World Meteorological Organization

Manuals and guides **7**

GUIDE TO OPERATIONAL PROCEDURES FOR THE IGOSS PILOT PROJECT ON MARINE POLLUTION (PETROLEUM) MONITORING

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PREFACE

In response to a recommendation of the United Nations Conference on the Human Environment, IOC and WMO have agreed to undertake jointly the design, planning and development of a marine pollution monitoring programme within the framework of the Integrated Global Ocean Station System (IGOSS). As an initial step in this direction, a Pilot Project on Marine Pollution (Petroleum) Monitoring launched in 1975, is aimed at monitoring petroleum-derived oils. Its planning and implementation are being supported by the United Nations Environment Programme (UNEP).

The Guide on Operational Procedures for this Pilot Project was reviewed on the basis of the recommendations of the Second Workshop on Marine Pollution (Petroleum) Monitoring (June 1976) and supersedes the earlier Operational Plan, issued in October 1974.

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1. INTRODUCTION

It is recognized that marine pollution monitoring is required and is indeed currently being carried out by various national authorities in some regions. 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 contaminations. Taken together with adequate data on pollutant inputs, pathways and exposure criteria, these surveys will permit an 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 still some distance away from 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 co-ordinate baseline surveys and develop monitoring capability to the point where a world-wide picture may be obtained. It has been accepted that Integrated Global Ocean Station System (IGOSS) provides a suitable framework for the co-ordination of marine pollution monitoring activities in respect of physical and chemical parameters that are fairly easily monitored with present widely available technology. Current and forthcoming national and regional studies will, however, provide the basis for further programme development. It should be recognized that the relevant marine pollution research to be co-ordinated by Global Investigation of Pollution in the Marine Environment (GIPME), will show how monitoring for other chemical and/or biological parameters can be developed on a sound scientific basis.

With this background as a basis for its deliberations Joint IOC/WMO Planning Group for IGOSS (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 co-ordinating role in a developing marine pollution monitoring programme.

Petroleum-derived oils have been selected as a vehicle upon which such a Pilot Project can be based. This 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. Petroleum monitoring is merely supposed to be the most convenient vehicle on which to base the test exercise, i.e. a project capable of involving nations with widely varying degrees of expertise and capable of providing examples of the type of organizational problems which have to be overcome in any co-ordinated exercise on marine pollution monitoring.

It was intended initially to limit the areas to be monitored by this Pilot Project to those of immediate interest. However, during the first years of the development of the project, the areas of monitoring were finally extended to include any ocean area in order to engage as many countries as possible and in order to base it on any regional activities being set up. Finally, this coverage of the world ocean is understood as a preparatory step for possible later phases of global pollution monitoring activities.

A draft of the Operational Plan for the Pilot Project on Marine Pollution Monitoring under the framework of IGOSS was prepared by Joint IOC/WMO Group of Experts on IGOSS Technical Systems Design and Development and Service Requirements (ITECH) on the basis of work carried out by different groups. Its final version (IOC-WMO/MPMSW-I/Task Team II) was circulated after a number of modifications to this Operational Plan were agreed upon during the IOC-WMO-USDC (United States Department of Commerce) Symposium and Workshop on Marine Pollution Monitoring (Petroleum) in Gaithersburg, Maryland, May 1974. The Operational Plan was reviewed during the operational phase of the Pilot Project by the Subgroup of Experts on the IGOSS Marine Pollution (Petroleum) Monitoring Pilot Project in London, May 1976. On the basis of these recommendations a final modification of the Operational Plan was adopted by the Second IOC/WMO Workshop on Marine Pollution (Petroleum) Monitoring in Monte Carlo, Monaco, June 1976 (IOC Workshop Report No. 10). The present document incorporates all modifications.

During this Second Workshop in Monaco an agreement was reached that the Pilot Project should be extended for two years until the end of 1978, the intention being to include two more years of data gathering, collation and final interpretation. It is also to allow for a proper and thorough evaluation of all activities developed within the Pilot Project. On the basis of those evaluations by the joint IOC/WMO Subgroup of Experts and the recommendations of the Working Committee for GIPME, a Third Workshop on Marine Pollution (Petroleum) Monitoring will advise on the future of the Pilot Project.

Meanwhile, if the Pilot Project is to be a continuous success, broader participation must be encouraged through training and technical assistance programmes (under way) to engage countries whose capabilities are limited. It is also recognized that national authorities will continue to address themselves to those marine pollution monitoring programmes of prime importance to them, and that this has to be taken into account during the implementation of the Pilot Project in order to develop it into a global pollution monitoring system.

2. BASIC COMPONENTS OF THE PILOT PROJECT

The Pilot Project is considered to be a valid test of the ability of IGOSS to provide specific data on the ocean-atmosphere system in response to a stated need for such data. The ultimate goal of the Pilot Project is to monitor marine pollution, measuring petroleum as a test pollutant, and to obtain a global picture of its distribution and dynamics.

It is proposed to base efforts on already established programmes and gradually to develop established national and/or regional efforts into a global organization. The international co-ordination of activities is shared by the IOC and WMO Secretariats which have contacted Member States requesting a statement of their interest, participation and capability in developing the Pilot Project and asked the countries to designate National Co-ordinators and participating laboratories. Recent information regarding organizational aspects such as data gathering, data processing, training and technical assistance programmes etc. is summarized in the IOC Workshop Report No. 10. An updated list of participating countries and National Co-ordinators is given as Annex I to the present document. However, the number of participating countries is expected to increase during 1977 since, starting January 1977, the area to be monitored will be extended to include all ocean areas.

2.1 Parameters to be monitored

Within the context of oil pollution monitoring and of the capabilities of Member States, the following parameters should be measured:

(a) Oil slicks and other floating pollutants,

(b) Floating particulate petroleum residues (tar balls),

(c) Tar on beaches,

(d) Dissolved/dispersed petroleum hydrocarbons in the ocean surface waters (1 metre depth).

Technical Guidelines for monitoring the above-listed parameters are provided below (item 7, pages 13-38). Member States are encouraged to participate in as many parts of the programme as possible.

2.2 Complementary information

For the evaluation of data on the monitoring parameters it is necessary to record:

(a) Position
(b) Date) of sampling.
(c) Time)

The following additional environmental data should be recorded, if available:

(d) Sea temperature

(e) Air temperature

(f) Wind speed and direction

(g) Wave period and height.

All this information should be obtained when possible at the time of sampling and be included in the sampling logs.

2.3 Areas to be monitored

The Pilot Project covers all ocean areas in order to engage as many countries as possible in the Pilot Project and to base efforts on as many regional and/or national programmes as possible. Up to now the following monitoring areas have been identified:

(a) The Baltic Sea, the Caribbean, the Gulf of St. Lawrence, the Mediterranean Sea, the North Pacific Ocean, the North Sea, the Red Sea and other sea areas in which monitoring programmes are in progress or planned;

(b) The Atlantic Ocean north of 5°S. This includes a tropical region in which high sea water temperatures may make degradation processes faster than in cooler waters;

(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, including the Gulf *) itself;

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

2.4 Means of data acquisition

General specifications for equipment and personnel qualifications needed to facilitate participation in any of the four monitoring tasks of the Pilot Project are considered to be for:

(a) Observation of oil slicks and other floating pollutants (pages 14-20)

(i) Suitable platforms

Ocean weather ships and research vessels
Voluntary observing ships, fishing vessels and their supporting ships
Offshore platforms
Aircraft

(ii) Equipment

None, except for remote sensing instruments

(iii) Personnel

Any personnel with some training in navigation; for remote sensing techniques specially trained engineers or scientists are required

(b) Tar ball sampling (pages 21-24)

(i) Suitable platforms

Ocean weather ships and research vessels
Other vessels designated by Member States, i.e. almost any type of seagoing vessel that can tow a neuston net

(ii) Equipment

Neuston nets of any design available

(iii) Personnel

Any able-bodied seaman who can understand and follow instructions for handling neuston nets

(c) Tar sampling on beaches (pages 25-27)

(i) Equipment

Simple scraping and particle collecting devices, a sieve to separate sand from tar

*) The term "Gulf" is used to describe the gulf geographically situated between Iran and the Arabian peninsula.

(ii) Personnel

Anyone who can follow simple instructions.

(d) Water sampling (pages 28-38)

(i) Suitable platforms

Research vessels
Ocean weather ships
Other vessels suitably staffed and equipped

(ii) Equipment

Sampling bottle and solvents

(iii) Personnel

Laboratory technicians for sampling and sample storage preparations.

(e) Analysis of samples

(i) Equipment for analysing tar samples

A scale to weigh tar collected from beaches; an analytical balance for tar balls from the ocean surface; in some cases a few glass beakers for handling solvents

(ii) Equipment for analysing water samples

Basic laboratory equipment (i.e. glassware, fume venting hood etc.); fluorescence spectrophotometer (scanning model preferred, but not mandatory)

(iii) Personnel for analysing tar samples

Laboratory technicians under supervision of junior scientists

(iv) Personnel for analysing water samples

Trained junior scientists (in some countries engineers trained in the operation of laboratory equipment) under the supervision of a qualified laboratory scientist).

(f) Data Analysis/Assessment

Personnel

Working scientists familiar with petroleum contamination problems.

2.5 Networks

Member States have been asked by the Secretariats to identify laboratories or analytical centres participating in the Pilot Project. In each case information is required from the laboratories about their present involvement and capability with respect to the parameters to be monitored, areas monitored, etc. Also requirements for training and technical assistance are to be specified. Participating countries have been asked to designate National Co-ordinators as focal points for the co-ordination of national activities related to the Pilot Project. The IOC/WMO

Secretariats are responsible for the international co-ordination. They are also requested to collect and distribute information on recommended sampling, sample preservation and analytical methods.

Recording of observations, sampling and subsequent analysis of samples should be carried out, using the methods described in the Guidelines for Monitoring Techniques (see page 13) to ensure as far as possible the comparability of the analytical results. Laboratories should participate in intercomparison exercises as indicated on pages 36-37. Laboratories carrying out intercomparison studies are further asked to submit their findings to the IOC/WMO Secretariats who will inform other laboratories and relevant working groups.

2.6 Products and services

The National Co-ordinator should arrange for all data from recorded observations and from analyses of collected samples to be forwarded to the Responsible National Oceanographic Data Centres (RNODCs). To date, two centres *) have agreed to act as RNODCs for data from the Pilot Project; they will provide statistical summaries and archival and retrieval services. Advice on formats for exchange of data, archiving procedures and retrieval is expected to be provided with the shortest possible delay through the IOC Working Committee (WC) on International Oceanographic Data Exchange (IODE).

It is envisaged that following major products may be developed:

(a) Regular information on the horizontal distribution of tar balls and oil slicks and other floating pollutants on the ocean surface;

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

(c) Data from fixed points (e.g. Ocean Weather Stations) on hydrocarbon concentrations. These will be useful for the study of temporal variations;

(d) Regular information on the distribution of tar on beaches.

2.7 Period of monitoring

After the initial two-year period which started on 1 January 1975, the Pilot Project will continue for a second two-year period starting from 1 January 1977 to allow the proper evaluation of data obtained and also to allow additional countries to participate after having received training and technical assistance.

3. INTERIM EVALUATION AND DEVELOPMENT OF THE PILOT PROJECT

As already stated, the Pilot Project is intended to enhance international co-ordination and co-operation required in relation to sampling, analyzing and interpretation of petroleum pollution data, with a view to its development into a global ocean monitoring system. In the interest of exploring all related problems

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*) These centres are:

US NODC
National Oceanographic Data Center
National Oceanic and Atmospheric Administration
Environmental Data Service
Washington, D.C. 20235, USA

JAPAN NODC
Japan Oceanographic Data Center
Hydrographic Department
Maritime Safety Agency
3-1, 5-chome Tsukiji
Chuo-Ku
Tokyo 104, JAPAN

and problem areas of pollution effectively and efficiently, information collected should be circulated immediately. The two-year extension of the Pilot Project (until the end of 1978) will serve to engage more nations as participants and to improve data gathering and data exchange.

This extension will also allow the proper evaluation of all activities developed within the Pilot Project. Thus a scientific report has to be prepared by the Joint IOC/WMO Subgroup of Experts on Marine Pollution (Petroleum) Monitoring not later than the end of 1977. There will also be a review of the international co-operation and technical assistance aspects. Taking into account these two reports and the views of the Working Committee for GIPME, a Third Workshop on Marine Pollution (Petroleum) Monitoring, to be convened during 1978, will advise on the future of the Pilot Project.

4. ORGANIZATIONAL ARRANGEMENTS IN SUPPORT OF THE PILOT PROJECT

The Joint IOC/WMO Subgroup of Experts on Marine Pollution (Petroleum) Monitoring will assist the Secretariats in the planning of operational steps and in the evaluation of the Pilot Project. Members of the Subgroup are required to assist occasionally in its management for which funds from United Nations Environment Programme (UNEP) have been made available.

5. TRAINING AND TECHNICAL ASSISTANCE

Member States have identified some of their training and technical assistance requirements. However, they are asked to keep the IOC/WMO Secretariats informed of their present requirements for a meaningful participation in the Pilot Project. Taking into account all information available, the IOC/WMO Secretariats will further develop training and technical assistance programmes, including exchange of experts and expert advice as funds can be made available.

6. SUMMARY OF ACTIONS REQUIRED TO IMPLEMENT THE PILOT PROJECT ON MARINE POLLUTION (PETROLEUM) MONITORING

6.1 The participation of additional Member States is to be encouraged by basing the Pilot Project on all regional and/or national monitoring activities in progress or planned and by arranging for training courses and technical assistance.

6.2 National Co-ordinators, the Joint IOC/WMO Subgroup of Experts and the IOC/WMO Secretariats are to exchange information on the management of the Pilot Project and on methods of gathering, evaluating and circulating scientific data.

High priority should be given to:

(a) the development of an international format for the exchange of marine pollution data;

(b) the establishment of intercalibration and intercomparison procedures and standard reference materials;

(c) expeditious forwarding of data collected within the Pilot Project to the Responsible National Oceanographic Data Centres (RNODCs).

6.3 The IOC Working Committee on International Oceanographic Data Exchange (IODE) is to be requested to develop a plan for recording, transmitting, storing, archiving and retrieving of information arising from the Pilot Project with a view to making recommendations for further development of the project.

6.4 A meeting of the Joint IOC/WMO Subgroup of Experts is to be convened in 1977 to undertake an evaluation of data resulting from the Pilot Project. There should also be a review of international co-operation and technical assistance aspects.

Taking into account their recommendations and the views of the Working Committees for IGOSS and GIPME, a Third Workshop on Marine Pollution (Petroleum) Monitoring, to be convened during 1978, will advise on the future of the Pilot Project.

7. GUIDELINES FOR MONITORING TECHNIQUES

To ensure the comparability of data to be reported, recording of observations, sampling and subsequent analyses of samples should be carried out following the guidelines listed further below as closely as possible.

As introduction to the different recording and sampling techniques this explanatory note should be printed on the cover of pad log forms:

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 of marine pollution monitoring.

The objectives of the Pilot Project are to obtain, through visual observations of oil slicks and other floating pollutants, through the measurement of smaller floating tar residues, through sampling tar on beaches and through measuring dissolved/dispersed petroleum hydrocarbons in the water, an appraisal of the quantity and the distribution of these pollutants over certain ocean areas and the manner in which the pollutants are transported and dispersed.

Area of the project

The Pilot Project covers all ocean areas.

Period of the project

The project will continue until the end of 1978.

When should the observations be made?

At almost any time following closely the guidelines for the different techniques listed below.

What to do with the completed forms?

Fold as indicated on the form and mail to the address given on the form or otherwise provided by the National Co-ordinator.

THANK YOU VERY MUCH FOR YOUR PARTICIPATION IN THIS IMPORTANT PROJECT

The techniques chosen to monitor petroleum pollution in the marine environment are:

A. OBSERVATION OF OIL SLICKS AND OTHER FLOATING POLLUTANTS

1. The Pilot Project covers all ocean areas.

2. Frequency of reporting

It is desirable that the continuous watch kept should also report visible pollutants. Whenever floating oil, petroleum residues and other floating pollutants are observed, this should be reported on the log form. In order to get the quantitative information on the status of pollution, it is equally important to know when no pollutants have been observed. For surface platforms, a report is required at least once every 24 hours. For aerial observations, a description of the flight path is required.

3. Methods of sampling

For visual observations, no instruments are needed, although polarizing glasses may be useful in detecting oil slicks. Guidelines for the visual recognition of oil slicks are given on page 19. Remote sensing techniques, e.g. side looking airborne radar (SLAR) and IR radiometers, may be used, if available.

A reporting format (given on page 20) is to be provided for recording the observations. Instructions for the completion and mailing of the form are given further below (pages 14-20).

4. Experimental products and services

The centres designated to analyse the visual observations of floating materials should develop experimental products to show (a) the areas polluted, (b) the intensity of the pollution and (c) the temporal variation. These products will be circulated by the IOC/WMO Secretariats to appropriate subsidiary bodies of IOC and WMO and to the National Co-ordinators for review and comment.

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 (PMOs) 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.

A_1 Instructions for completing the form

(Code tables with explanations are given on pages 16-18).

1. PLATFORMS (i.e. ships, coastal stations)

1.1 Day and time should be reported in GMT

1.2 The position of the observing platform should be reported in degrees and minutes; the appropriate quadrant of globe should be entered in column Q_c.

1.3 Information on the status of observation should be entered in column A on following occasions:

(a) Whenever oil or floating plastic wastes are observed enter 2 in column A. Information should be entered using the code tables provided on pages 16-18. Time and position should refer to the last point at which the pollutant was observed.

(b) If no pollutants were observed during the last 24 hours enter 0 in the column A. The position of the observing platform at local noon should be reported.

(c) If it has not been possible to observe the sea surface owing to bad visibility, navigational difficulties or other reasons during the preceeding 24 hours enter 1 in column A. The position of the observing platform at local noon should be reported.

1.4 Observational details about the pollutant should be given in colums B, C, D (see code tables on pages 16-18).

1.5 The dimensions of the polluted area should be given in tenths of nautical miles; 2.8 n.m. should be entered as 028; if an area is covered with many narrow patches or lines of oil, the dimensions of the total area should be reported and not the dimensions of the individual patches or lines. A simple, narrow slick with a width less than 1/10 n.m. should be reported as 000.

1.6 If possible, wind direction and speed should be reported.

1.7 If possible, wave period and height should be reported.

2. AIRBORNE PLATFORMS (i.e. aircraft, helicopters)

2.1 Day and time should be reported in GMT.

2.2 The position of the observing platform should be reported in degrees and minutes; the appropriate quadrant of globe should be entered in column Q_c; the positions should be reported in sequential order along the flight path.

2.3 Information on the status of observation should be entered in column A on following occasions:

(a) At the start and finish of the flight, as well as at significant points of deviation, the time and position should be reported by entering 0 in the column for A if no pollutants were observed.

(b) Whenever oil or floating plastic wastes are observed enter 2 in column A. Observational details should be entered using the code tables below. Time and position should refer to the last point at which the pollutant was observed.

(c) If it has not been possible to observe the sea surface for a significant portion of the flight, report the position of the end of this segment by entering 1 in the column for A, giving the dimensions of this segment in the appropriate column.

2.4 Observational details about the pollutant should be given in the columns B, C, D (see code tables below).

2.5 The dimensions of the polluted area should be given in tenths of nautical miles; 2.8 n.m. should be entered as 028; if an area is covered with many narrow patches or lines of oil, the dimensions of the total area should be reported and not the dimensions of the individual patches or lines. A simple, narrow slick with a width less than 1/10 n.m. should be reported as 000.

2.6 If possible, wind direction and speed should be reported.

A_2 Code tables with explanations

1. OBSERVATIONAL CODE

This code is to be used for the information to be entered in the columns marked A, B, C, D on the log form for "Observation and Reporting of Oil Slicks and other Floating Pollutants".

A. Status of observation

0 = Sea surface observed but no pollutants to report

1 = Sea surface not observed due to high sea, bad visibility or other reasons

2 = Pollutants observed and recorded

B. Types of pollutants

1 = Thin oil film (may include occasional minor patches or lumps of thick oil)

2 = Thick oil layer (may be surrounded by oil film which should be included under this same code)

3 = Plastic materials

4 = Other (specify in remarks column)

C. Configuration

1 = Continuous cover

2 = Patches

3 = In a line or lines

4 = Patches and lines

D. Concentration

The concentration should be reported in eighths as, for example the WMO code for ice coverage:

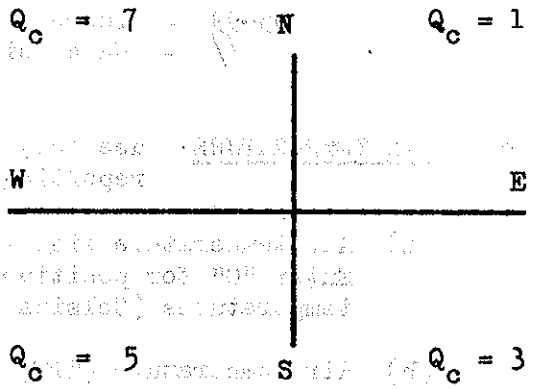
1 = 1/8 (slightest presence of reported pollutant)
2 = 2/8
3 = 3/8
4 = 4/8 (half of surface is covered)
5 = 5/8
6 = 6/8
7 = 7/8
8 = 8/8 (continuous cover)

2. **TYPE OF PLATFORM/SHIP**

	Type Platform	code visual	code remote
1	Ship	11	12
2	Lightship	21	22
3	Buoy	31	32
4	Fixed Tower	41	42
5	Submersible	51	52
6	Aircraft	61	62
7	Ice Island	71	72
8	Fixed Coastal Station	81	82
9	Other	91	92

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 (LoLoLo = 000 or 180 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)

4. **WIND DIRECTION AND SPEED**

(a) 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°;

(b) True wind speed (ff) or force on the Beaufort scale
Enter "UNIT" with "m" for metres per second, with "k" for knots or with "B" for force on Beaufort scale. After having recorded the true wind speed in units indicated, prefix zeros to fill the field. Enter "00" for calm. When reporting on tar balls or on dissolved/dispersed hydrocarbons omit unit indicator and enter wind speed in metres per second;

5. WAVE PERIOD AND HEIGHT

(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 slashes (//).

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

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

6. AIR TEMPERATURE use only when reporting tar balls or when reporting dissolved/dispersed hydrocarbons

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

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

7. WATER TEMPERATURE use only when reporting tar balls or when reporting dissolved/dispersed hydrocarbons

(a) Sea surface temperature (TwTwTw)
Enter the temperature to tenths of a degree Celsius. To indicate negative temperatures, add 50.0 to the value of the temperature measured and drop the negative sign. For example: -1.2° C would be encoded "512". 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 slash (/). Prefix zeros to fill the field.

A_3 Distinguishing between oil slicks and natural films

1. A large spill of crude oil or a residual fuel is obvious to the eye. If it has not weathered to tar-like residues, there will be central zones which are brown or black in colour and represent thick oil layers. These will be surrounded by thinner films sometimes showing in iridescence or sheen (variously coloured bands due to light interference effects). At the outer edges of the petroleum slick even thinner films may be present with no obvious colours, but which are visible because of their damping action on the capillary ripples. Subsequent weathering of these heavy petroleum products will lead to tar residues within the oil slick, usually at the downwind end.

2. Description of different surface films:

It is difficult to distinguish from natural sea slicks the films formed by some types of petroleum products. Such problems may arise when the spilled oil is a distillate product (diesel oil, lubricating fluid or fuel oil) which has spread into a thin film with little colour. Since an oil film of this type eliminates capillary ripples as does a natural sea slick, the following guides should assist the observer in making a correct distinction between petroleum oils and natural films.

(a) When winds are greater than 8 knots (4.1 m/sec), natural slicks are readily dispersed by air-sea dynamic forces. Under these conditions visible natural surface slicks will be rare, and visible films should be assumed to be oil pollution. However, a long, narrow, isolated band of slick, sometimes containing seaweed and ship's refuse, should not be considered an oil slick.

(b) Under relatively calm wind conditions a considerable percentage of the sea surface can become covered with a natural surface film as evidenced by extensive areas of ripple-damped water. Pollutant slicks may be confused with natural films under such low-wind conditions. The following rules of judgement would be applied in such a case.

If the conditions in section 1. (above) are observed (layers of dark oil and/or tar residues) or if an oily odour is evident, the slick should be considered of petroleum origin.

When the sea is relatively calm and if the slick is not obviously petroleum, it should be considered to be a natural film and not recorded. When it is not possible to distinguish between a natural slick and an oil slick, the quantity of pollutant oil would be extremely small and the slick should not be recorded as a spill.

3. Description of a Natural Slick:

A visible sea surface pattern in which capillary ripples are absent. It is a film of recent biologically produced organic material, generally too thin to be seen except by its ability to damp and to resist the formation of wind-generated ripples. The ripple-damping property produces a light reflection pattern which renders the slick visibly different from the surrounding rippled water. The slick is usually lighter in appearance than the rippled water, but may be seen as a darker zone when viewed toward the sun. In the absence of wind (no ripples) the entire sea surface appears to be slicked, however, there is generally no evidence of film colour, oily odor or of thick films unless pollutant oils are present.

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)

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	UN	DIR.		SPEED		PER		HT.		
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	TRACK	TRACK	N	d	d	f	f	P_w	P_w	H_w	H_w	

PERSON/ORGANIZATION TO CONTACT FOR FURTHER INFORMATION ABOUT THIS REPORT

NAME _____ ADDRESS _____

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

1. Sampling devices

Any neuston sampler is suitable if used correctly, i.e. properly deployed and towed at its optimum speed. Nets fitted to the sampler should be a plain nylon web type.

Information on methodology and suitable neuston samplers is to be found in:

Sameoto D.D. and Jaroszynski L.O. (1969), Journal of the Fisheries Research Board of Canada, Volume 26, pages 2240–2244,

Derenbach J.B. and Ehrhardt M. (1975), Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung, Volume 24, pages 207–208,

David P.M. (1965), Journal of the Marine Biological Association of the United Kingdom, Volume 45, pages 313–320,

Zooplankton sampling, Unesco Monographs on oceanographic methodology No. 2, second imp. 1974, 174 pages.

2. Areas for monitoring

The Pilot Project covers all ocean areas.

3. Frequency of sampling

Samples should be taken daily from ships in transit if arrangements can be made. From more permanent stations, including Ocean Weather Ships, sampling should be done on a weekly to monthly basis.

Samples may be taken day or night recognizing that daytime sampling will reduce the amount of organisms sampled. It is desirable (but not essential) to collect a water sample for measuring dissolved/dispersed hydrocarbons (see page 28) at the same location where the tar sampling is carried out.

4. Sampling procedure

(a) 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 disturbed by the ship; i.e. tow from a point well forward on the ship, preferably from a boom.

Bridles must be attached to the side of the sampler nearest the ship. They are to be adjusted, depending on the elevation of the towing point on the ship so that the sampler rides smoothly.

(b) Adjust towing speed so that the sampler rides smoothly on the surface for at least 1 nautical mile (depending on the sampler used). If wave conditions do not allow a smooth ride, record average time of the sampler's muzzle being above or below the surface (instead of sampling it) per time unit and correct the value of the area swept accordingly.

(c) At completion of tow, retrieve sampler, wash contents down to the end of the net and empty it into a fine sieve. If the net contains an undue amount of extraneous material, it should be emptied into a clean bucket containing water. Recover tar balls from the sieve or from the bucket and place them in a glass jar.

(d) If fresh sticky oil adheres to the net in quantities exceeding approximately 10% of the sample taken, wash the net with a suitable solvent and retain the washings in a jar. In case quantitative recovery of the tar sticking to the net surface is impossible, record its estimated concentration in percentage of the total sample.

Label the glass jar containing the sample according to the label as given on page 24. The estimated amount of the sample lost to the net surface is to be recorded under "comments".

5. Preservation of samples

Freezing of samples is recommended; if this is impracticable, refrigerate the samples (unless the cruise exceeds a 24-hour period).

6. Recording of sampling

Record location, time, sea conditions and other pertinent information on the log form as given on page 23. Code tables for use with this log can be found in "Code tables with explanations"on page 16-18.

7. Dispatch of samples

Labelled sample jars, together with the log, should be packed securely in a transit case and sent to the appropriate analytical laboratory as specified by the National Co-ordinator.

8. Analysis procedures

(a) If the tar balls have been separated manually from the larger particulate matter also sampled, 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,

(i) dissolve the tar balls in carbon tetrachloride,

(ii) recover the carbon tetrachloride extract and evaporate to dryness; the solvent used to clean the net (as in item 4/d, above) also should be evaporated. In both cases the evaporation may be hastened by mild heating, but actual boiling should be avoided as there will be some loss of volatile components. The operation should be carried out under a fume hood or in an area with good ventilation,

(iii) weigh the residue.

9. Completing and forwarding of log forms

The weight of the tar measured is entered in the log column "weight of tar". Enter the calculated weight of tar per area swept by the sampling net in the column "tar concentration".

The completed log forms should be forwarded as advised by the National Co-ordinator. A copy of the IOC "ROSCOP" form should also be filled out and forwarded upon completion of the cruise (a copy of this form and explanations are given in Annex III, pages 44-50).

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_o	L_o	L_o	L_o	d d	f f	P_w P_w	H_w H_w	S N	T 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

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 _____

C. TAR SAMPLING ON BEACHES

1. Selection of area

The sampling should take place on a sandy beach with:

(a) a uniform shoreline (no breakwaters or cuts)

(b) a gentle slope, but not so as to make distance from the high the the low tide mark too large for practical sampling

(c) a minimum of human activity, such as foot traffic, etc.

(d) no local land based sources of petroleum pollution (otherwise specify in the remark column of the log form).

2. Size of sampling zone

Tar should be collected on a few stations along the coast. At each station three randomly chosen narrow strips of 1-2 metres are sampled, running across the beach from the backshore to the low tide mark.

If uniformity of tar distribution in a given area has been established, by statistical analysis of either air photography data or tar data, the number of strips per station can be reduced to one. If different areas can be distinguished, each area should be treated separately.

3. Frequency of sampling

Sampling should take place at least every two weeks.

4. Duration

One year, to start at any time of the year.

5. Sampling procedure

Stake out area as proposed above in item 2. Clean off all debris from the backshore to the waterline prior to sampling. Sample only at or near the time of low tide. Pick up all visible solid and semi-solid pieces of tar on the beach surface only.

In heavily polluted areas where picking up tar would be too time consuming, sample by brushing the upper 2-3 cm of the selected strips, using a long handled floor brush. The piles created which consist of sand, tar, and other particles are then sampled and washed free of sand with sea-water, using a 2 mm net screen.

6. Sample analysis

The analysis is done by weighing the tar. This is easily achieved when dealing with clean tar lumps. When tar particles are heavily covered with sand, cleaning is not advisable. In this case it is suggested that the volume rather than the weight be measured: Fill tar particles into graduated cylindre. Add water so that all particles are covered. Read volume. Decant water into second graduated cylindre. Subtract smaller from larger volume. The weight of the tar can then be calculated from the displaced volume of water, assuming a density of 0.85 (multiply difference by 0.85).

In heavily polluted areas with hundreds of grams of tar per square metre of beach, it is preferable to separate different sizes of tar particles, using a sieve with a 1 cm mesh size. The tar contained in each fraction is measured as described above.

7. Sample recording

A draft form with coding instructions and explanatory notes is given on page 27. If the samples are treated according to the instructions above, the weight should be entered under "weight of collected tar", subcolumn 1 (non-sandy).

L O G F O R M

FOR

SAMPLING AND REPORTING TAR ON BEACHES

Location	Date	Recorder	Time of low tide (local time)	Time of collection (local time)	Prevailing[1] wind direction	Weight of collected tar in grammes per square metre non sandy[2]	sandy[3]	coquina[4]	total	REMARKS

(1) Prevailing wind direction

as: onshore
offshore
alongshore

(2) nearly free of sand

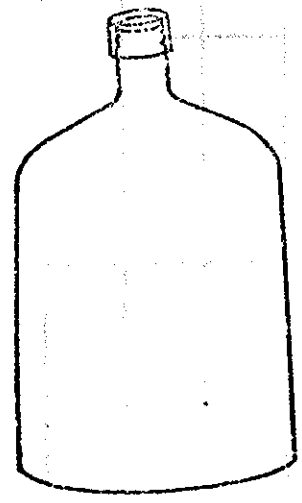
(3) coated with sand and may contain entrained sand

(4) very hard and brittle and may contain shell fragments

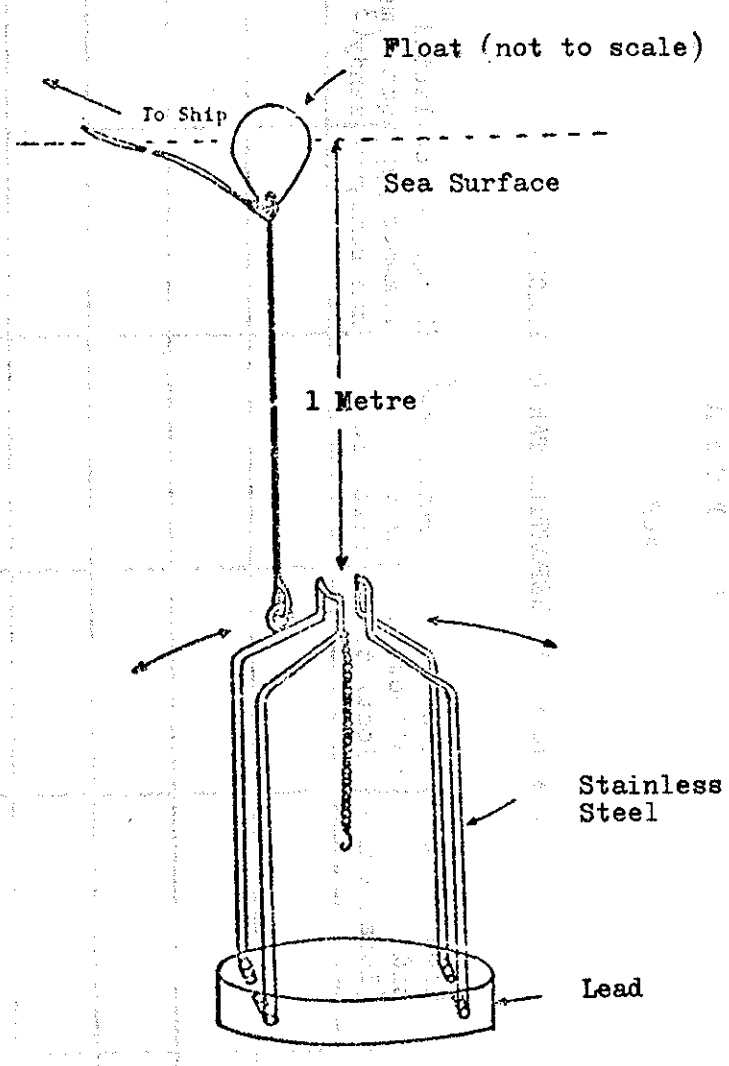
D. PROCEDURES FOR SAMPLING AND REPORTING PETROLEUM HYDROCARBONS DISSOLVED AND DISPERSED IN SEA WATER

1. Sampling

A device, such as illustrated below, is recommended for collecting the water samples. It consists of a weighted bottle holder with a clean amber glass bottle (3-4 litres) containing 50ml of carbon tetrachloride (CCl_4). The bottle holder is attached to a float by a line of 1 m length. A second retrieving line of suitable length is attached to the float which is used to pull the assembly back on board the ship after the sample has been taken.



Sample Bottle with Cap



Bottle Holder with Floatation Unit

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 to avoid water that has been disturbed or contaminated by the ship. The bottle will immediately sink to 1 m 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.

Before being issued by the participating laboratory prior to field work, the bottle is thoroughly cleaned with aromatic-free CCl_4 to remove any traces of aromatic substances from the bottle. It is then sealed with a screw-cap lined with cleaned tin foil.

CCl_4 is recommended because it is readily available in a highly purified form, has a high affinity for non-polar organic molecules, is nonflammable and only slightly soluble in water. Since its specific gravity is appreciably greater than that of sea-water, the CCl_4 usually separates readily from the aqueous phase without emulsification. Aromatic-free CCl_4 may be prepared from reagent grade CCl_4 by distillation or chromatographic methods (other solvents may be suitable but the analytical procedures might require appropriate modification. The National Co-ordinator should permit a degree of flexibility according to local circumstances).

CAUTION: Since the concentration levels of dissolved/dispersed petroleum residues in the open ocean are generally in the range of a few microgrammes per litre, or less, throughout the procedure great care must be taken to avoid contamination.

2. 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 in triplicate if possible, to allow averaging of analytical results. If hydrographic conditions are of special interest, samples should be taken more frequently to obtain an indication of short-term variations.

3. Sample preservation

Samples should be kept in the dark. If carbon tetrachloride is used, freezing is not necessary since this solvent is an effective bacteriostat. Samples should be analyzed as soon as possible.

4. Recording of samples

To identify the samples, a log must be maintained, noting the position, date and time. Specified environmental data should also be given when possible. The log form is given on page 32; code tables with explanations are provided on pages 16-18.

A label (format specified on page 33) should be attached to the sample bottle bearing the samle number from the log and the position, date and time of sampling.

If samples are collected from depths greater than 1 metre, enter depth of sampling in the "Remarks" space of the log form and use the Data Documentation Form (as given on page 34) to indicate methods used for sampling and analysis.

Immediately upon completion of a cruise, prepare and submit the IOC "ROSCOP" form (a copy of this form and explanations are given in Annex III, pages 44-50).

5. Dispatch of samples

Sample bottles, together with the logs should be packed securely in a transit case and sent to the appropriate analytical laboratory.

6. Processing and analysis of sample

(a) Extraction

The bottle containing the water/CCl_4 mixture is shaken vigorously to disperse the CCl_4 throughout the water. The CCl_4 is then allowed to settle. This is repeated several times.

Allow the two phases to separate and draw the CCl_4 phase into a clean pipet or use a glass separatory funnel (with thoroughly cleaned unlubricated teflon stopcock). In either case the CCl_4 phase is retained in a clean glass bottle. A second extraction is carried out by adding 50 ml of CCl_4 to the seawater sample and repeating the foregoing procedure. The two aliquots of CCl_4 are combined.

(b) Extract concentration

Although CCl_4 is an ideal solvent for the extraction process, it is not a suitable medium for the fluorescence analyses. Therefore, the CCl_4 must be replaced by a solvent, such as n-hexane, which does not absorb light in the 300–400 nm range.

The CCl_4 is removed from the extract by evaporating it to dryness in a rotary evaporator or by mild heat on a hot plate (do not allow the extract to boil). If 80% of the CCl_4 has been evaporated, and an aqueous phase is still present, pipette the CCl_4 phase into another clean glass bottle and evaporate to dryness.

The residue is dissolved in aromatic-free n-hexane (check by fluorescence analysis) and transferred quantitatively to a 5 ml volumetric flask.

(c) Clean-up

In some areas of very high biological productivity or in some estuarine areas it is necessary to clean up the extract before proceeding with the analysis. The clean-up should remove non-petroleum material that fluoresces under given conditions. Furthermore, materials that may cause quenching will be removed simultaneously. A general clean-up procedure is outlined on page 35, though this procedure might need some modifications to meet local conditions.

(d) Fluorescence measurement

A sample of the dissolved extract in n-hexane is placed in a capped 1 cm silica cell. Measure the intensity of fluorescence at 360 nm (excitation at 310 nm). If possible, both the excitation and fluorescence spectra for each sample should be scanned. The mixture of fluorescing substances (primarily substituted benzenes and polynuclear aromatic compounds) present in crude and residual fuel oils are excited most strongly at 310 nm and fluoresce most intensively in the neighborhood of 360 nm.

(e) Calibration

The fluorescence intensity of the sample analyzed is compared with the fluorescence of a reference solution of almost the same concentration as the unknown extract or a series of reference solutions. References should be run at least once a day under identical instrumental conditions.

At present, each laboratory may use its own standards, e.g. dilutions of a crude oil of medium aromatic content. However, to enable equipment and concentrating procedures to be inter-calibrated, chrysene is the chosen intercomparison chemical. Details for ordering this intercomparison material and its handling for the procedure are given on pages 36-37.

(f) Blanks

Throughout the procedure great care must be taken to ensure that samples are not being contaminated; for example avoid unnecessarily exposing the sea-water sample, the CCl_4 or the final extract to the atmosphere or other potential sources of contamination. Solvents and equipment are frequently to be checked for contamination by analyzing blanks, treating a pre-extracted water sample as a blank sample and/or taking 100 ml of CCl_4 as a blank extract. Sources of contamination should be eliminated rather than correcting the actual obtained data for the blank value.

(g) Quantification of results

The unknown concentration of the sample processed is obtained by interpolating between reference measurements. Finally, measure the volume of seawater processed and calculate the concentration of fluorescing material regarding the calibration as µg of oil or chrysene equivalents per litre of seawater sampled.

7. Handling of data

Data obtained from samples and intercomparison measurements should both be recorded on the log form (as given on page 32). If data are provided as chrysene equivalents prefix "C" to the concentration found. If the concentration was measured as oil equivalents, provide the fluorescence properties of the standard oil used as compared to chrysene. Using concentrations of about 0.5 µg/ml the fluorescence of the standard oil and chrysene is measured. The intercomparison ratio "R" required is calculated as

$$R = \frac{\text{fluorescence intensity of the chrysene sample} \times \text{weight of standard oil in the sample}}{\text{fluorescence intensity of the standard oil sample} \quad \text{weight of chrysene in the sample}}$$

The value for "R" should be entered under remarks. Together with specifications of the standard oil used, this value for "R" should also be reported to the laboratory circulating the intercomparison material (address on page 33).

The analytical laboratory is also requested to prepare and submit along with the log form a Data Documentation Form as given on page 34 If standard procedures are adopted, indicate "standard techniques".

All forms should be submitted to the Responsible National Oceanographic Data Centre (RNODC) through national channels as established by the National Co-ordinator.

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) µg/l	DATE* (GMT)			TIME* (GMT)		QUAD	POSITION*								OPTIONAL ENVIRONMENTAL INFORMATION												REMARKS
									LAT.				LONG.				WIND		WAVE			TEMP. °C							
			DAY	MO.	YR.	HR.	MIN.		DEG.	MIN.			DEG.	MIN.			DIR.	SP.	PER.	HT.		AIR			WATER				
			Y	Y	M	M	J	J	G	G	g	g	Q_c	L_o	L_o	L_o	L_o	L_o	L_o	L_o	L_o	L_o	d	d	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) 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 _____

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) _____
FILTER SPECIFICATIONS _____
TYPE OF SAMPLE BOTTLE _____
FIXING AGENTS _____
SAMPLE OF FROZEN/REFRIGERATED/AMBIENT (CIRCLE ONE) _____
DURATION OF SAMPLE STORAGE _____

DATE (S) OF SAMPLE ANALYSIS _____
SAMPLE APLIT _____
EXTRACTION PROCEDURE _____
SAMPLE PURIFICATION _____
ESTIMATED ACCURACY OF METHOD _____
OTHER (USE REVERSE) _____

NOTE:

(1) eg. PLASTIC BUCKET, GLASS JAR, SHIPS 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

D_1 Procedures for a clean-up of the extract +)

As stated on page 30 (item 6 (c) a clean-up of the extract might be necessary to remove non petroleum material. These compounds could interfere with the fluorometric measurement, especially when analyzing samples taken from areas of very high biological productivity or from eastuaries. The clean-up is achieved by a simple column chromatographic purification. Again, great care must be taken not to introduce contamination during any of the analytical steps involved.

1. Preparation of the materials to be used:

   (a) Silica gel with an average diameter between 0.4 and 0.8 mm (appr. 20–40 mesh) is refluxed in a Soxhlet-extractor for about six hours, using n-hexane, carbon tetrachloride or any other suitable clean solvent, renewing the solvent at least once during this procedure. The silica gel is then kept either in a glass stoppered glass bottle for later use or it is dried out and activated at 120° C for approximately eight hours. During the subsequent cooling of the silica gel, but while it is still warm, it is poured into a glass stoppered bottle and immediately deactivated with 2% W/W of distilled water (see (b) below). After shaking the bottle the silica gel is kept to equilibrate for several hours and then ready for use. If not being used immediately, it may be kept for up to four weeks depending on the handling and the moisture in the air. Storage in a desiccator is highly recommended.

   (b) In case there are any doubts about the purity of the distilled water necessary for deactivation, it should be prepared as follows: Distill water (as clean as you can obtain it) in an all-glass still in the presence of $K_2S_2O_8$ at a pH of 2–3 (adjusted with H_2PO_4).

2. Preparation of the column and chromatographic clean-up

   Fill the lower part of a glass tube (inner diameter 0.9 cm; the lower end reduced in diameter and stoppered with some clean glass wool) for a length of 14 cm with deactivated silica gel. Apply the sample extract (prepared as indicated in item 6 (b), page 30 and dissolved in a few ml of n-hexane) to the column and eluate with n-hexane. The first 6 ml are discarded as they come off the column. The next 30 ml are collected, concentrated by evaporation and analyzed as described in item 6 (d), page 30.

   This clean-up procedure may have to be modified as to the deactivation of silica gel, the lengths of the column etc. to meet local conditions. When a clean-up procedure is adopted, blanks and standards should be treated in the same way as the actual water extracts.

+) These procedures were agreed in principle during the Second Workshop on Marine Pollution (Petroleum) Monitoring and outlined afterwards by some members of the Joint IOC/WMO Subgroup of Experts on IGOSS Marine Pollution (Petroleum) Monitoring Pilot Project.

D_2 Quantification of analytical results by calibrating instruments and intercomparison of analytical procedures using chrysene *)

1. Chrysene has been chosen as the intercomparison chemical, see item 6 (e pages 30-31. Intercomparison samples may be obtained by mail from:

Dr. Adam Zsolnay
IGOSS-PETSTAND
Duke University Marine Laboratory
Beaufort, North Carolina 28516
USA

Small quantities of the standard material are available at no cost. Two different intercomparison solutions are available:

(a) Chrysene I is packed under nitrogen in sealed, dark vials containing 0.5, 1.0, 3.0, 5.0, 10.0 µg of chrysene without solvent. Chrysene I samples are used to calibrate the fluorimeter (omitting concentration procedures).

(b) Chrysene II is packed under nitrogen in sealed dark vials containing 0.5, 1.0, 3.0, 5.0, 10.0 µg chrysene in about 100 ml of CCl_4. Chrysene II is to be used for the intercomparison of concentration procedures. In the event that participants encounter difficulties with postal authorities regarding the solvent, Chrysene I should be ordered and the solution prepared with CCl_4 in the participants' own laboratories.

When working on either Chrysene I or II samples, the participating laboratory will quantitatively remove the material from the vial to prepare intercomparison solutions. When calibrating the fluorimeter with Chrysene I samples, the exact volume (5 ml; see item 6 (d), page 30) of n-hexane shall be recorded as it is necessary for calculating the concentration of chrysene per ml.

(c) Chrysene III. In many countries pure chrysene can be purchased without difficulties. Therefore, laboratories should be able to prepare their own intercomparison solutions in n-hexane (Chrysene III), which should be used as reference solutions when measuring actual water extracts.

However, these Chrysene III solutions are to be compared with the circulated intercomparison material (Chrysene I or II). All subsequently purchased batches of chrysene are also to be compared, to ensure equal fluorescence properties. If possible, both the excitation and fluorescence spectra for each solution should be scanned.

2. Intercomparison procedures

(a) For the calibration of the fluorimeter use Chrysene I samples after dilution with n-hexane to make up 5.0 ml. Measure the fluorimetric response for various concentrations up to the maximum concentration to be expected from the actual water extracts. Also to be measured are the reference solutions used

*) These procedures were agreed in principle during the Second Workshop on Marine Pollution (Petroleum) Monitoring and outlined afterwards by some members of the Joint IOC/WMO Subgroup of Experts on IGOSS Marine Pollution (Petroleum) Monitoring Pilot Project.

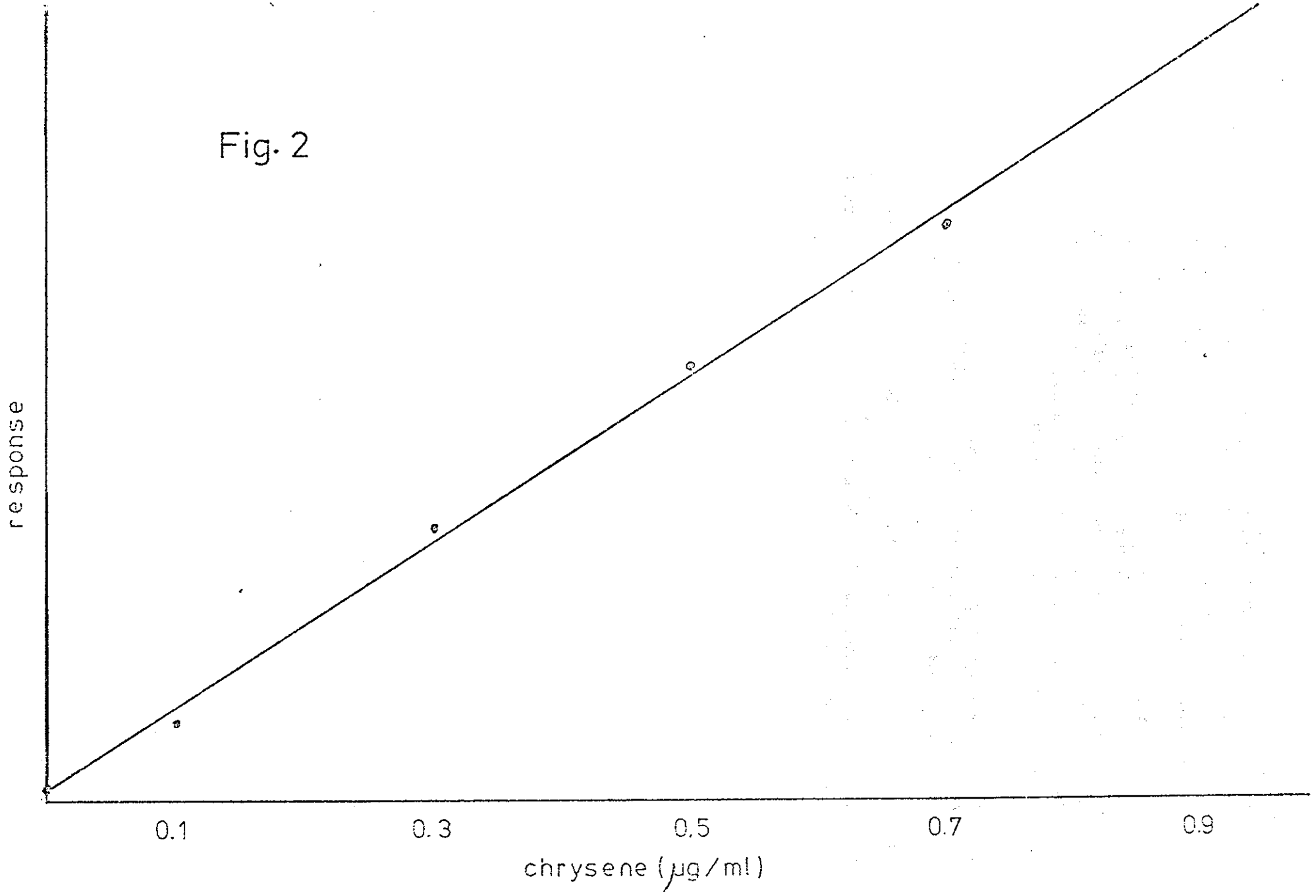
(Chrysene III samples). Response values are then plotted against chrysene concentrations in µg/ml to obtain a calibration curve as shown on page 38. Note, if the intercomparison solutions are kept free from contamination, there should be only a very small non-zero intercept.

(b) For intercomparing the concentration procedures Chrysene II samples are treated as water extracts (described from item 6 (b), page 30 onwards). The actual fluorimeter reading, when compared with the response to be expected from the known concentration of chrysene (provided in the sample) and the calibration curve, will then indicate any possible loss of material or contamination.

(c) For intercomparing measurements of water extracts parallel to the extract prepared reference solutions (Chrysene III samples) are measured, as described from item 6 (e), page 30 onwards.

Should difficulties be encountered with the above intercomparison procedures, further advice can be obtained from the Marine Laboratory at Duke University which is also prepared to carry out a few parallel measurements if necessary.

Fig. 2



ANNEX I

LIST OF NATIONAL CO-ORDINATORS FOR THE PILOT PROJECT ON MARINE POLLUTION (PETROLEUM) MONITORING WITHIN THE FRAMEWORK OF IGOSS

Country:	National Co-ordinator:
ARGENTINA	Commander Alberto J. VALDEZ Comité Argentino de Oceanografía Rivadavia 1917 - Buenos Aires
AUSTRALIA	The Secretary Department of the Environment and Conservation P.O. Box 1937 Canberra City A.C.T. 2600 Attn.: Mr. B. JORDAN
BELGIUM	Capitaine de Frégate M. RENSON Directeur Opérationnel du Programme "Recherche et Developpement" sur l'Environnement Commission Interministerielle de la Politique Scientifique Rue de la Science 8 1040 - Bruxelles
BRAZIL	Almirante O.A. Amaral AFFONSO Director de Hidrografia e Navegaçao Ilha Fiscal Rio de Janeiro
CANADA	E.M. LEVY Atlantic Oceanographic Laboratory Bedford Institute of Oceanography Dartmouth Nova Scotia B2Y 4A2
EGYPT (ARAB REPUBLIC OF)	A. BELTAGY Institute of Oceanography and Fisheries Kayet-Bey Alexandria
FRANCE	J.C. MOURLON Centre National pour l'Exploitation des Océans 39, Avenue d'Iéna 75016 Paris
GERMANY (FED. REPUBLIC OF)	D. KOHNKE Head, Deutsches Ozeanographisches Datenzentrum Deutsches Hydrographisches Institut Bernhard-Nocht-Strasse 78 D-2 Hamburg 4 (visual observations)

GERMANY (FED.REPUBLIC OF)	D. STADLER Deutsches Hydrographisches Institut Bernhard Nocht-Strasse 78 D-2 Hamburg 4 (Analyses)
GREECE	E.M. VERYKOKAKIS Head, Chemical Department Institute of Oceanographic and Fishing Research Agios Kosmas Ellinikon Athens
ICELAND	J. OLAFSSON Marine Research Institute Skulagata 4 Reykjavik
INDIA	S.Z. QASIM National Institute of Oceanography P.O. Caranzalem DONA PAULA Goa
IRELAND	W.G. CALLAGHAN Marine Unit, Meteorological Service 44, Upper O'Connell Street Dublin 1
JAMAICA	R.M. WRIGHT Chairman, Marine Advisory Committee Mines and Geology Division Ministry of Mining and National Resources P.O. Box 191 Hope Gardens Kingston 6
JAPAN	D. SHOJI Hydrographic Department Maritime Safety Agency 3-1, Tsukiji 5-chome Chuo-ku Tokyo 104
KOREA (REPUBLIC OF)	J.W. LEE Korea Ocean Research and Development Institute P.O. Box 131 Cheong Ryang Seoul
MEXICO	A. AYALA CASTAÑARES Coordinador de la Investigacion Cientifica Universidad Nacional Autónoma de México Apartado Postal 70-157 Mexico 20, D.F.

NETHERLANDS	J.W. GUNSTER c/o Rijkswaterstaat Directie Noordzee Nijverheidsstraat 2 Rijswijk (z.h.)
NIGERIA	T. OREKOYA Nigerian Institute for Oceanography and Marine Research P.M.B. 12529 Lagos
NORWAY	G. BERGE Directorate of Fisheries Institute for Marine Research P.O. Box 2906 5011 Bergen Nordnes Documents should be sent to: R. FORT Royal Ministry of Environment P.O. Box 8013, Oslo Department N-Oslo 1
PAKISTAN	J. ALI KHAN Marine Biology Department University of Karachi Karachi
POLAND	Z. MLODZINSKA Institute of Meteorology and Water Economy Maritime Branch Waszyngtona str. 42 81-342 Gdynia
SOMALIA	Mr. MURIDI ALI SALAH Head, Technical Department Ministry of Fisheries and Marine Transport P.O. Box 438 Mogadishu
SOUTH AFRICA (REPUBLIC OF)	The Secretary for Planning and Environment Private Bag X213 Pretoria 0001
SPAIN	D.J. ROS Director Laboratorio Oceanográfico del Mar Menor San Pedro del Pinatar Murcia
THAILAND	M. HUNGSPREUGS Head, Department of Marine Science Chulalongkorn University Bangkok

UNION OF SOVIET SOCIALIST REPUBLICS	Y. BELYAEV Oceanographic Committee of the Soviet Union Gorky Street 11 Moscow K-9
UNITED KINGDOM	I. WHITE Ministry of Agriculture, Fisheries and Food Fisheries Laboratory Remembrance Avenue Burnham-on-Crouch Essex CMO 8HA
UNITED STATES OF AMERICA	B. THOMPSON Chief, Oceanographic Services Branch National Weather Service 8060 13th St. Silver Spring MD
URUGUAY	Ing. Quin. H. MUJICA President, Comision Nacional de Oceanografía Ministerio de Educacion y Cultura Sarandi 430-2° piso Casilla Correo 710 Montevideo

Participating countries whose National Co-ordinators have not yet been designated:

East African Community (Kenya, Tanzania, Uganda)

Finland

Indonesia

New Zealand

Sweden

ANNEX II

RECOMMENDATIONS ADDRESSED TO THE NATIONAL CO-ORDINATORS FOR THE PILOT PROJECT ON MARINE POLLUTION (PETROLEUM) MONITORING WITHIN THE FRAMEWORK OF IGOSS

National Co-ordinators for the Pilot Project should take all necessary steps to initiate the Pilot Project and/or co-ordinate on-going national activities within the Pilot Project in accordance with the schedule and prodecures outlined in the Operational Plan. National Co-ordinators are, therefore, requested:

- to provide necessary instructions and forms to all participating national laboratories, institutions and other organizations working on projects outlined in the Operational Plan;

- to ensure that all completed forms for the Pilot Project be forwarded to the RNODCs through appropriate national channels for generation of statistical summaries and archival and retrieval purposes;

- to arrange participation of fishing vessels, their supporting ships and other suitable platforms for the different recording and sampling tasks within the Pilot Project.

ROSCOP (2nd edition) ANNEX III

OCEANOGRAPHY

GENERAL CRUISE INVENTORY

A00
DATA CENTRE: _____
REFERENCE No : _____

A - GENERAL INFORMATION ON WORK PERFORMED

A01 Expedition/Project _____
Cruise No. or name _____

A91 Declared national prog. ? YES ☐ NO ☐ PART ☐
Exchange restricted ? ☐ ☐ ☐

A02 Ship or platform _____
Platform type _____

A92 Co-operative programme ? YES ☐ NO ☐ Name _____
Co-ordinated internationally? ☐ ☐ By whom? _____

A03 Country | A04 Organization | A05 Chief scientist(s)

A06 NAMES AND ADDRESSES OF ORGANIZATIONS AND PERSONS

Whom to query	Final disposition of data
a _____	A _____
b _____	B _____
c _____	C _____
d _____	D _____
e _____	E _____

A07 Date : from: ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ DAY MONTH YEAR
to: ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋

A08 General ocean areas

A09 Type(s) of marine zone(s)

A10 Geographic area Latitude ⌊_⌋⌊_⌋° ⌊_⌋⌊_⌋' ⌊_⌋⌊_⌋" N/S Longitude ⌊_⌋⌊_⌋⌊_⌋° ⌊_⌋⌊_⌋' ⌊_⌋⌊_⌋" E/W

If all data were collected at a fixed station, fill in the co-ordinates

Discipline and type of measurements	Index 10 x 10 Qc	L	G	G	Index 1° x 1°	Discipline and type of measurements	Index 10 x 10 Qc	L	G	G	Index 1° x 1°

M - METEOROLOGY

	Number	i	l	Format		Number	i	l	Format
M01 Upper air observations					M04 Ice observations				
M02 Incident radiation					M05 Occasional standard measurements				
M03 Air-sea interface studies					M06 Systematic standard measurements				
					M90 Other measurements				

Remarks

H - HYDROGRAPHY

	HS SURFACE	Number	i	I	Format		NEAR SEA FLOOR (⩽ 10 m)	Number	i	I	Format
H01	Continuous temperature recording					H05	Continuous temperature recording				
H02	Continuous salinity recording					H06	Continuous salinity recording				
H03	Discrete temperature measurements					H07	Discrete temperature measurements				
H04	Discrete salinity measurements					H08	Discrete salinity measurements				
	HP PHYSICAL						HC CHEMICAL				
H09	Classical oceanographic stations					H21	Oxygen				
H10	Vertical profiles (STD/CTD)					H22	Phosphates				
H11	sub-surface measurements underway					H23	Total - P				
H12	Mechanical bathythermograph (no. of drops)					H24	Nitrates				
H13	Bathythermograph-expendable (no. of drops)					H25	Nitrites				
H14	Sound velocity stations					H26	Silicates				
H15	Acoustic stations					H27	Alkalinity				
H16	Transparency					H28	pH				
H17	Optics					H29	Chlorinity				
H18	Diffusion (Dynamic)					H30	Trace elements				
H80	Other measurements					H31	Radioactivity				
						H32	Isotopes				
						H33	Dissolved gases				
						H90	Other measurements				

Remarks

P - POLLUTION

P01	Suspended solids					P07	Waste water : BOD				
P02	Heavy metals					P08	Waste water : Nitrates				
P03	Petroleum residues					P09	Waste water : Microbiology				
P04	Chlorinated hydrocarbons					P10	Waste water : Other				
P05	Other dissolved substances					P11	Discoloured water				
P06	Thermal pollution					P12	Bottom deposits				
P90	Other measurements					P13	Contaminated organisms				

Remarks

G - GEOLOGY GEOPHYSICS

GL MEASUREMENTS MADE AT A SPECIFIC LOCATION	Number	i	l	Format		Number	i	l	Format
G01 Dredge					G09 Sea floor temperature (⩽ 1 m from bottom)				
G02 Grab					G10 Acoustical properties of the sea floor				
G03 Core-rock (no. of cores)					G11 Engineering properties of the sea floor				
G04 Core-soft bottom (no. of cores)					G12 Magnetic properties of the sea floor				
G05 Sampling by divers					G13 Gravimetric properties of the sea floor				
G06 Sampling by submersible					G14 Radioactivity measurements				
G07 Drilling					G70 Other measurements				
G08 Bottom photography									
G08 GU MEASUREMENTS UNDERWAY					GE TYPES OF STUDIES				
G21 Motion picture of sea floor (no. of nautical miles)					G31 Physical analysis of sediments				
G22 Bathymetry-wide beam (no. of nautical miles)					G32 Chemical analysis of sediments				
G23 Bathymetry-narrow beam (no. of nautical miles)					G33 Paleothermy				
G24 Side scan sonor (no. of nautical miles)					G34 Paleomagnetism and rock magnetism				
G25 Seismic reflection (no. of nautical miles)					G35 Paleontology				
G26 Seismic refraction (no. of nautical miles)					G36 Geothermy				
G27 Gravimetry					G37 Geochronology				
G28 Magnetism					G38 Mineral & fossil resources				
G80 Other measurements					G39 Littoral zone studies				
					G90 Other				

Remarks

D - DYNAMICS

D01 Current meters (no. of stat.)					D07 Drift cards (no. released)				
D02 Current meters (average duration of measurement)					D08 Bottom drifters (no. released)				
D03 Currents measured from ship drift					D09 Tidal observations (duration)				
D04 GEK					D10 Sea and swell (no. of observations)				
D05 Drifters (number)					D90 Other				
D06 Swallow floats (number)									

B - BIOLOGY

	Number	i	I	Format		Number	i	I	Format
B01 Primary productivity					B20 Commercial benthic molluscs				
B02 Phytoplankton pigments					B21 Commercial benthic crustacean				
B03 Seston					B22 Attached plants and algae				
B04 Particulate organic carbon					B23 Intertidal organisms				
B05 Particulate organic nitrogen					B24 Borers and foulers				
B06 Dissolved organic matter					B25 Birds				
B07 Bacterial and pelagic micro-organisms					B26 Mammals and reptiles				
B08 Phytoplankton					B27 Deep scattering layers				
B09 Zooplankton					B28 Acoustical reflections on marine organisms				
B10 Neuston					B29 Biologic sounds				
B11 Nekton					B30 Bioluminescence				
B12 Invertebrate nekton					B31 Vitamin concentrations				
B13 Pelagic eggs and larvae					B32 Aminoacid concentration				
B14 Pelagic fish					B33 Hydrocarbon concentrations				
B15 Amphibians					B34 Lipid concentrations				
B16 Benthic bacteria and micro-organisms					B35 ATP-ADP-AMP concentrations				
B17 Phytobenthos					B36 DNA-RNA concentrations				
B18 Zoobenthos					B37 Taggings				
B19 Commercial demersal fish					B80 Other measurements				

Remarks

B5 TYPES OF STUDIES					B60 Physiology				
B51 Identification					B61 Behaviour				
B52 Spatial and temporal distribution					B62 Pathology, parasitology				
B53 Monitoring and surveillance					B63 Toxicology				
B54 Biomass determination					B64 Gear research				
B55 Description of communities					B65 Exploratory fishing				
B56 Food chains energy transfers					B66 Commercial fishing				
B57 Population and environments					B67 Aquaculture				
B58 Population structures					B90 Other measurements				
B59 Taxonomy, systematics, classification									

Remarks

INTRODUCTION

to the ROSCOP and instructions for completing the form

The Report of Observations/Samples Collected by Oceanographic Programmes (ROSCOP) is intended as an important new mechanism in support of the international oceanographic data exchange system. Compilation of ROSCOP forms will provide the basis for timely inventories of data and samples resulting from on-going programmes available for international exchange. ROSCOP is thus intended to fill the gap between the first announcement of an oceanographic programme to the Intergovernmental Oceanographic Commission (IOC) and the eventual cataloguing of data actually received by the World Data Centres (WDCs) or National Data Centres. Further, the ROSCOP inventory could be used by the international scientific community to provide a referral service to data which may not be exchange routinely through the WDC system.

The ROSCOP form has been recommended for immediate use and will be kept under constant review by the Intergovernmental Oceanographic Commission's Working Committee on International Oceanographic Data Exchange.

Send the form as soon as practicable after completion of a cruise or observational programme to *one* of the following (as arranged):

Your National Oceanographic Data Centre or Designated Agency:

or the Hydrographic Service of the International Council for the Exploration of the Sea, Charlottenlund Slot, DK-2920 Charlottenlund, Denmark;

or World Data Centre A, Oceanography, National Oceanic & Atmospheric Administration, Environmental Data Service, Rockville, Maryland 20852, U S A.

or World Data Centre B, Oceanography, Molodezhnaya 3, Moscow B-117-296, USSR.

Further copies of these forms may be obtained from any of the above centres

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LIMITS OF OCEANS AND SEAS
(IHB Special Publication n° 23)

1 Baltic Sea
- a. Gulf of Bothnia
- b. Gulf of Finland
- c. Gulf of Riga

2 Kattegat, Sound and Belts
3 Skagerrak
4 North Sea
5 Greenland Sea
6 Norwegian Sea
7 Barents Sea
8 White Sea
9 Kara Sea
10 Laptev (or Nordenskjold) Sea
11 East Siberia Sea
12 Chukchi Sea
13 Beaufort Sea
14 Northwest Passage
- a. Baffin Bay

15 Davis Strait
- a. Labrador Sea

16 Hudson Bay
- a. Hudson Strait

17 Arctic Ocean
- a. Lincoln Sea

18 Inland Sea off the West Coast of Scotland
19 Irish Sea and St. George's Channel
20 Bristol Channel
21 English Channel
22 Bay of Biscay
23 North Atlantic Ocean*
- a. NE Atlantic (Limit 40 W)
- b. NW Atlantic (Limit 40 W)

24 Gulf of St. Lawrence
25 Bay of Fundy
26 Gulf of Mexico
27 Caribbean Sea
28 Mediterranean Sea
- a. Western Basin
- b. Eastern Basin
- c. Strait of Gibraltar
- d. Alboran Sea
- e. Balearic Sea (or Iberian Sea)
- f. Ligurian Sea
- g. Tyrrhenian Sea
- h. Ionian Sea
- i. Adriatic Sea
- j. Aegean Sea

29 Sea of Marmara
30 Black Sea
31 Sea of Azov
32 South Atlantic Ocean*
- a. SE Atlantic (Limit 20°W)
- b. SW Atlantic (Limit 20°W)

33 Rio de la Plata
34 Gulf of Guinea
35 Gulf of Suez
36 Gulf of Aqaba
37 Red Sea
38 Gulf of Aden
39 Arabian Sea
40 Gulf of Oman
41 Gulf of Iran (Persian Gulf)
42 Laccadive Sea
43 Bay of Bengal
44 Andaman or Burma Sea
45 Indian Ocean
- a. Mozambique Channel

46 Malacca and Singapore Straits
- a. Strait of Malacca
- b. Strait of Singapore

47 Gulf of Thailand (Siam)
48 East Indian Archipelago (Indonesia)
- a. Sulu Sea
- b. Celebes Sea
- c. Molucca Sea
- d. Gulf of Tomini
- e. Halmahra Sea
- f. Ceram Sea
- g. Banda Sea
- h. Arafura Sea
- i. Timor Sea
- j. Flores Sea
- k. Gulf of Boni
- l. Bali Sea
- m. Makassar Strait
- n. Java Sea
- o. Savu Sea

49 South China Sea (Nan Hai)
50 East China Sea (Tung Hai)
51 Yellow Sea (Hwang Hai)
52 Sea of Japan
53 Inland Sea (Seto Naikai)
54 Sea of Okhotsk
55 Bering Sea
56 Philippine Sea
57 North Pacific Ocean*
- a. NE Pacific (Limit 180°)
- b. NW Pacific (Limit 180°)

58 Gulf of Alaska
59 Coastal Waters of SE Alaska and
- a. British Columbia

60 Gulf of California
61 South Pacific Ocean*
- a. SE Pacific (Limit 140°W)
- b. SW Pacific (Limit 140°W)

62 Great Australian Bight
- a. Bass Strait

63 Tasman Sea
64 Coral Sea
65 Solomon Sea
66 Bismarck Sea

* Indicated subdivisions do not appear in publication IHB N°23.

INSTRUCTIONS FOR COMPLETING ROSCOP ENTRIES

(Please use black ink or black pencil to facilitate reproduction)

A - GENERAL INFORMATION

A00 This section is reserved for the "Responsible" Data Centre, which will enter therein its own reference to be used in future exchanges of data between centres.

A01 Enter the name, acronym and order number which the body in charge uses to designate the expedition, operation or project.

A02 Enter the full name and international radio call sign of the ship or platform from which the measurements were made. Specify the type of ship or platform using table 1:

TABLE 1

01	research ship
02	non-specialized ship
03	satellite
04	balloon
05	aircraft
06	anchored buoy
07	drifting buoy
08	submerged float (anchored)
09	submerged float (drifting)
10	fixed platform
11	fixed coastal station
12	drifting ice
13	submersible
14	other

A03 Enter the name of the country to which the body financing or in charge of the operation belongs.

A04 Enter the name of the body financing or in charge of the operation.

A05 Enter the name of the person in charge of the scientific work (chief of mission) during the period covered by the report.

A06 Enter the names and addresses of the bodies or individuals responsible for the measurements (a, b, . . . e) and the bodies or individuals who may be requested to supply the original measurements (A, B, . . . E). In columns i and I on the following pages enter respectively the lower- and upper-case letters designating those responsible for and those in possession of the measurements indicated.

A07 Enter the dates (day, month, year) of the beginning and end of the period covered by the report (generally from the time of setting sail to the return to a port).

A08 Enter the names of the oceans and seas in which the ship operates, using the definition of their limits supplied by the International Hydrographic Organization, Monaco - special publication No. 23 (see above).

A 09 Enter the type of marine zone(s) covered during the period to which the report applies. All cases encountered for all disciplines, should be entered using table 2:

TABLE 2

01	river mouth, estuary
02	zone connected with the sea (harbours, lagoons, salt-water pools)
03	intertidal or nearshore zone
04	coastal zone
05	offshore zone in inland sea
06	open sea (ocean)
07	continental shelf
08	continental margin
09	major ridges, fractures
10	seamounts, guyots and atolls
11	abyssal plain
12	troughs
99	others

A91 Check box "yes" or box "no" according to whether the operation is or is not part of a "Declared National Programme" (DNP). If only parts of it are DNP, check box "part" in this section. In the latter case further details may be given for each type of data in the form of a note. No entry should be made in this section if DNP status has not been determined at the time of preparation of the form. If the exchange of all or of certain data is subject to conditions, indicate this by checking one of the boxes on the second line.

A92 Check (on the top line) box "yes" or box "no" according to whether the operation is or is not part of a co-operative programme and, if "yes", give its name in the space provided. Check (on the bottom line) box "yes" or box "no" according to whether the operation is or is not part of an internationally co-ordinated programme and, if "yes", give the name of the co-ordinator in the space provided.

B - INFORMATION TO BE SUPPLIED FOR EACH HEADING IN THE VARIOUS CATEGORIES

Number of stations: the manner in which the quantity of observations obtained is to be shown depends on the type of data collected. Enter the following as appropriate, in the "number" column corresponding to each type of data:

1. *Number of stations*: the number of stations at which one or more measurements or samples of the type have been obtained. Do not report the total number of discrete measurements or samples obtained unless only one measurement was made at each station.
2. *A number* (in the appropriate units) for certain types of data to indicate such information as the nautical miles steamed while the particular measurement was being made or the number of samples. The number of stations involved in the measurement may, however, also be shown, if necessary, indicating this by "station"

Remarks.

The "remarks" spaces should be used to supplement or clarify the information supplied. A separate sheet to be submitted with the report, may be used for these notes.

3. *A cross*, if the number of stations cannot be given and if it is desired to indicate that information of this type has been obtained at some time during the cruise.

i - I: see explanations under A06.

Data format: specify, in the "format" column, the form of the the original raw data, using table 3:

TABLE 3

1	manuscript or publication
2	automatic printing
3	graph recording
4	punched card
5	punched tape
6	analogue recording on magnetic tape
7	digital recording on magnetic tape
8	photograph
9	samples
0	other or unspecified

C - LOCALIZATION

Information concerning the localization of the areas in which observations have been collected may be given on the form in three differents levels of details, of which one is compulsory.

(a) *Level one* (optional) is shown under heading A08 concerning general information on the cruise. It is a matter of merely indicating the name or names of the oceans and seas frequented (using the nomenclature of the International Hydrographic Organization - see above);

(b) *Level two* (compulsory) corresponds to the marking, in respect of each category of measurement, of the 10° latitude x 10 longitude squares in which these measurements have been carried out (10° x 10° index);

(c) *Level three* (recommended) supplies further details relating to level two information. Information is given, in respect to each category of data or measurement, and in each 10° x 10° square, as to the 1° x 1° squares to which the measurements (1° x 1° index) in fact apply.

The 10° x 10° and 1° x 1° indices ((b) (c)) are determined in the following manner:

Index 10° x 10°

1. *Discipline and type of measurements* : Enter in this column the name or abbreviation (HC for chemistry, for example) of the discipline concerned. If measurements of several parameters have been taken within the same square, enter these on the same line. If not, record them separately (in the example shown table 4, HC appears twice).

TABLE 4

Discipline and type of measurements	Index 10° x 10° Qc	L	G	G	Index 1° x 1°
P, M, HC	3	3	1	4	
		3	1	5	
		3	1	6	
HC	3	3	1	7	
D	3	3	0	7	

2. *10° squares* : In the Qc column, give the quadrant of the globe (Qc) according to World Meteorological Organization Code 3333 reproduced schematically in table 5. In column L indicate the latitude in tens of degrees of the 10° square concerned, and in the G G columns the figure in hundreds, and the figure in tens, for the longitude in degrees of the same square, e.g. the 10° square from 30°N to 40°N and 40°W to 50°W would be coded 7304

TABLE 5

Code figure	Latitude	Longitude	Qc - Quadrant of the globe
1	North	East	Qc = 1 (N, E)
3	South	East	Qc = 3 (S, E)
5	South	West	Qc = 5 (S, W)
7	North	West	Qc = 7 (N, W)

(Equator; Greenwich meridian)

Index 1 x 1 (optional)

1. *Discipline and type of measurements*: Give either discipline concerned or a specific type of data of that discipline (represented by its abbreviated reference).

2. *1 squares* :
In this column indicate, on the line corresponding to the appropriate discipline (or specific type of data) and after the entry for the 10° x 10° square concerned, the two-figure numbers made up of the unit figures of the latitude and longitude relating to the 1° x 1° squares in which observations have been made (see table 6).

TABLE 6

Discipline and type of measurements	Index 10° x 10° Qc	L	G	G	Index 1° x 1°
D, HP	1	2	0	6	23, 32, 42
M03	7	3	0	4	27, 28, 29
M03	7	3	0	5	42, 53

This shows:

Dynamics and Physical Oceanography in squares
22° (to 23°) N, 063° (to 064°) E
23° (to 24°) N, 062° (to 063°) E
and 24° (to 25°) N, 062° (to 063°) E

Meteorology (air-sea interface) in squares
32° (to 33°)N, 047° (to 048°)W
32° (to 33°)N, 048° (to 049°)W
etc.

Remarks.
In certain cases an annotated chart showing the route followed and the points where measurements were obtained may replace the 1° x 1° index.

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