

Not to be quoted without prior reference to the International Council for the Exploration of the Sea<sup>x)</sup>

International Council for the  
Exploration of the Sea

C.M.1971/E:35  
Fisheries Improvement Committee



POLLUTION OF THE NORTH SEA - REPORT OF A MEETING OF ANALYSTS  
AND BIOLOGISTS HELD AT CHARLOTTENLUND 17-18 August 1971

The meeting, which was chaired by Professor Korringa, was attended by representatives of Belgium, Denmark, France, Germany, Netherlands, Norway, Sweden and the United Kingdom (See Annex 1). Dr Portmann, (United Kingdom) was appointed Rapporteur and the meeting adopted a Draft Agenda which had been drawn up by the Secretariat.

The Chairman opened the meeting by recalling the events which had led to the decision that ICES should sponsor and co-ordinate a study of pollutants in the North Sea. He reminded the meeting of the decisions of previous meetings and pointed out that it was the purpose of the present meeting to organise a survey of pollutants in fish from the North Sea. The meeting recognised that the proposed study, although it may eventually lead to monitoring, was intended as a baseline survey. Following lengthy discussions, it was felt that there were two questions to be answered a) the level of pollutants in fish marketed in the various countries, and b) the level of pollutants in the various parts of the North Sea, and it was considered that although there was some overlap between these, the answers to the first question would not satisfy the second. It was also agreed, since the areas of major risk were the coastal waters, that sampling should be more intense in these areas than in the offshore areas of the North Sea.

With a view to achieving an overall coverage of the North Sea with a minimum of additional effort, the meeting reviewed the existing national programmes. These were considered under five headings and are summarised below and in Annex 2 in the form of maps.

Chlorinated aromatic hydrocarbons

These substances include pesticides such as DDT, and PCB's. The present United Kingdom sampling and analysis programme already gives reasonable

x) General Secretary,  
ICES,  
Charlottenlund Slot,  
2920 Charlottenlund,  
Denmark.

coverage of the western North Sea boundary and it was learned that a similar proposed Netherlands programme would give coverage of the Belgian and Netherlands coast. It appeared that the offshore areas of the North Sea were also reasonably well covered by the incidental samples collected in the course of the various national research programmes. The German representatives stated that their programme would be modified to concentrate on the German Bight area (boundaries 5°E and 57°N) and the Swedish representatives stated that their analytical programme would be capable of including a limited number of samples from the Skaggeiak, if these could be provided by other interested parties. There appeared to be no arrangements for sampling off Denmark or Norway apart from a few fish and molluscs which were being done for other purposes by the Norwegian Agricultural College.

#### Aliphatic Chlorinated Hydrocarbons

The materials particularly considered by the meeting were the tar-like wastes of PVC manufacture which, although they contain small proportions of aromatic substances, are mainly short-chain chlorinated aliphatic hydrocarbons. The only existing programme of sampling and analysis for these substances was the joint programme operated by Norway and Sweden, although a number of countries had the necessary apparatus but lacked the manpower. The joint Norway Sweden programme approved for 1972, proposed up to 2000 samples of fish and water and was initially intended to survey only the North Sea area of North of 57°.

#### Mercury

With the exception of Denmark, all the countries represented already have programmes for the analysis of mercury in fish. The extent of these programmes varied from country to country but appeared to give a good overall coverage of most of the North Sea including the coastal areas, although in certain countries eg Belgium, manpower was a limiting factor.

#### Metals other than Mercury

With the exception of Denmark, most countries were either already analysing fish for a variety of other metals, or planned to do so. However, the number of samples analysed and the choice of metals varied considerably according to national priorities. Belgium was carrying out a number of analyses on fish but these were limited by available manpower. Most countries were examining for lead, copper and zinc, but only Netherlands and the United Kingdom specifically mentioned cadmium, although both Belgium and Norway proposed to analyse for cadmium in the future.

### Other substances

These included oil, organophosphorus, pesticides, benzpyrenes, etc and limited interest was expressed in these by the various delegates. The various national programmes differed in their interests and were as follows. Belgium has a programme for the analysis of oil in fish, water and sediments which includes regular fish samples and a few shellfish samples, but the overall numbers were said to be limited by manpower. Both Sweden and France were carrying out analyses for anionic detergents in shellfish and fish, and in France work was also in progress on paper mill wastes. Netherlands was becoming increasingly interested in materials such as phenols which affect the taste of marine products and was hoping to include fish samples in the programme in the near future. Both Norway and Sweden expressed an interest in hydrocarbon analysis and the Norwegian representative indicated that they had plans for hydrocarbon analysis along a transect from Norway to Shetland. Sweden's representative stated that they were developing analytical methods for penta-chlorophenol in fish and oil in water. The United Kingdom representatives also expressed interest in hydrocarbon analysis but said that at the present time activity was limited to analysis of small numbers of fish and shellfish for benz-pyrene like substances.

In the light of these existing or proposed programmes, the meeting considered that a base-line survey of pollutants in the North Sea could be undertaken in 1972. The representatives recognised, however, that a number of problems would have to be overcome if the base-line survey were to be a success. These included manpower problems, limited facilities for certain pollutants, the need for intercalibration of analytical methods, decisions on which substances should be analysed for, common choice of species and age groups. As a result the meeting formulated a series of recommendations and advice to the council with the hope that these would be adopted and acted on at national level. These recommendations are listed at the end of this report.

The absolute essentiality of intercalibration of methods of analysis was recognised and after considerable discussion it was agreed that two types of samples should be circulated. These were to be a fish oil to be analysed for chlorinated aromatic hydrocarbons and a sample fish-meal to be analysed for metals. It was agreed that Dr Tiews (Germany) would circulate the oil sample and Mr Holden (United Kingdom) the fish meal sample. Dr Portmann (United Kingdom) was appointed co-ordinator of the intercalibration programme. In the light of experience in a similar OECD exercise, it was agreed that many laboratories, because of other national

programmes, would have difficulties in assigning priorities and that agreement to participate in the intercalibration programme should therefore come from Directors of Laboratories, who could then be responsible for indicating the priority of the sample. A questionnaire for completion by participating laboratories is attached at Annex 3.

There was some discussion as to the urgency of obtaining data on all the pollutants identified and it was accepted that not all countries would be able to provide data on all substances if the survey were to be conducted in 1972. There was general agreement therefore that priority be given to obtaining base-line data on chlorinated aromatic hydrocarbons and metals, particularly mercury. However, data on other substances would be welcomed if participating countries were in a position to provide it.

The meeting agreed that if the data obtained were to be truly comparative not only the methods needed to be calibrated, but also, so far as possible, efforts should be concentrated on the same species. It was therefore agreed that in order to obtain an estimate of the level of pollutants in food, fish, efforts be concentrated on cod (Gadus morhua), plaice (Pleuronectes platessa), and herring (Clupea harengus), the cod being selected as a lean, round, demersal fish, plaice as a lean, flat, demersal fish and herring as a fat, pelagic fish. It was pointed out that cod livers would be useful as fatty organs of predatory fish for chlorinated aromatic hydrocarbon residue estimation. In order to obtain an estimate of pollutant distribution around the North Sea, it was agreed that sedentary species or locally defined stocks of a particular species were desirable. Various species were proposed and although certain problems were recognised, it was decided that the common mussel (Mytilus edulis) and brown shrimp (Crangon crangon) would be used. In order to minimise variations due to size, age and season and variations in residue levels with different muscle tissues, a set of procedures for sampling storage and analyses was agreed (See Annex 4).

On the basis of the agreed programme for a base-line survey, the representatives of France, Germany, Netherlands, Sweden and the United Kingdom, stated that they would probably be able to participate fully. The representatives of Norway and Belgium considered that they would certainly be able to participate in part of the programme, and the representative of Denmark stated that subject to adequate facilities being provided, they also hoped to participate.

It was agreed in principle that the information obtained in the base-line survey should be prepared as soon as possible in 1972 and that a meeting of participating analysts would be required not later than July 1972 in order to discuss the results of the intercalibration exercise, and if possible, also the base-line study data, in order that a report could be prepared for submission to the 1972 Council Meeting.

Recommendations and Advice to the Council in connection with the proposed Base-Line Study of pollutants in the North Sea.

1 All the countries represented at the meeting reported above, agreed to the need for participating in the proposed Base-Line survey of chlorinated hydrocarbons, mercury, other heavy metals, and chlorinated aliphatic hydrocarbons. The meeting, however, recognised that in collecting this Base-Line Survey data, the limiting factor in most countries would be the manpower available for carrying out the necessary chemical analyses and, recognising the responsibility of all countries to co-operate in the programme, strongly recommended that these countries should take steps to eliminate this difficulty.

2 The meeting also recognised, however, that in 1972 some countries might not be able to analyse for all the pollutants and therefore agreed that for the time being, priority be assigned to mercury and chlorinated aromatic hydrocarbons. The meeting considered it desirable that these countries should take the appropriate steps to cover the whole field of the investigations as soon as possible.

3 The meeting recognised that different countries may have different priorities with respect to the number of species and individual species to be analysed. However, because initially some countries may be able to analyse only limited numbers of samples, it was agreed that plaice, cod and herring should be analysed by all participants.

4 In order to get an estimate of the level of pollutants in food fish from the North Sea, the meeting agreed that data should be collected on as many species as possible, but that priority should be given to analysis of Gadus morhua, Pleuronectes platessa and Clupea harengus.

5 In order to get an estimate of the degree of pollution around the North Sea, the meeting agreed that it was necessary to sample locally defined non-migratory species. The meeting therefore agreed that to meet this requirement priority be given to analysis of Mytilus edulis, particularly those used for human consumption, and where possible also Cranzon crangon.

6 The meeting recognised that an essential part of the proposed Base-Line Study would be an intercalibration of methods for the various materials to be analysed and recommended that steps be taken urgently to begin this. The meeting recognised that this might involve not only exchange of samples, but also visits and/or possibly meetings by the analysts concerned. As a first step, the meeting agreed that standard samples should be distributed for intercalibration of chlorinated aromatic hydrocarbon and metal analysis procedures.

7 The meeting considered that most of the North Sea area would be adequately sampled, but that there was no sampling programme off Norway for chlorinated aromatic hydrocarbon analyses, and strongly recommended that this should be included.

8 The meeting also noted that because of territorial fishery limits, certain coastal areas off Norway and particularly off Denmark would still not be sampled and it was felt that in these areas the countries concerned must be held responsible for the analysis of coastal samples.

9 The meeting felt that the primary problem with chlorinated aliphatic hydrocarbons was the lack of information on the present concentration and effects of these materials in the environment. However, although as an interim measure the Norwegian-Swedish programme could include analysis of samples for other countries, the meeting considered it desirable that other countries should develop a capacity to undertake this type and noted that help and advice would be available from Norway and Sweden on this matter.

10 The meeting could foresee no particular problems involved in the collection of base-line data on metals, including mercury, in marine fish and shellfish.

11 The meeting considered that it would probably be necessary to hold a meeting of participants not later than July 1972 in order to formulate a report on the progress of the intercalibration exercise and if possible on the Base-Line Study for submission to the 1972 Council meeting.

Professor P Korringa.  
(Chairman)

Dr J E Portmanr  
(Rapporteur)

ANNEX 1

LIST OF PARTICIPANTS

BELGIUM

Mr G Neirinckx Institut de Recherche Chimique, Ministère d'Agriculture,  
5, rue du Moulin, Tervuren

DENMARK

Mr P Agger Danmarks Fiskeri - og Havundersøgelser, Charlottenlund  
Slot, 2920 Charlottenlund

Mr Jan Boetius Danmarks Fiskeri - og Havundersøgelser, Charlottenlund  
Slot, 2920 Charlottenlund

Mr Vagn Olsen Danmarks Fiskeri - og Havundersøgelser, Charlottenlund  
Slot, 2920 Charlottenlund

FRANCE

Mr P Le Lourd CNEOX, 39, avenue d'Iéna, Paris 16e

Mme F Soudan I.S.T.P.M., La Noe, route de la Jonelière, 44 Nantes

GERMANY

Dr D Schmidt Deutsches Hydrographisches Institut, Wüstland 2,  
2 Hamburg 55

Professor K. Tiews Institut für Küsten - und Binnenfischerei, Palmaille 9,  
2, Hamburg 50

NETHERLANDS

Professor P Korringa Netherlands Institute for Fishery Investigations,  
(Chairman) PO Box 68, Haringkade 1, Ijmuiden

Dr J C Duinker Netherlands Institute for Sea Research, Texel

Dr P Hagel RIVO, Haringkade 1, Ijmuiden

Mr D Tromp Institute for Sewage Treatment, Westeinde 3a, Voorburg

NORWAY

Mr R Lange Institute of Marine Biology, University of Oslo,  
Frederiksgt 3, Oslo 1

Mr K H Palmork Institute of Marine Research, Nordnesparken 2, 5011 Bergen

SWEDEN

Mr L Danielson Environment Protection Board, 17120 Solna 1

Dr B I Dybern Institute of Marine Research, S-45300 Lysekil

Mr S Jensen Environmetal Protection Board, Wallenberglab,  
Roslagsvagen, Stockholm

UNITED KINGDOM

Dr J E Portmann                   MAFF Fisheries Laboratory, Burnham-on-Crouch, Essex  
(Rapporteur)

Mr A V Holden                   DAFS, Freshwater Fisheries Laboratory, Pitlochry

Dr G Topping                   DAFS, Marine Laboratory, PO Box 101, Victoria Road,  
Aberdeen

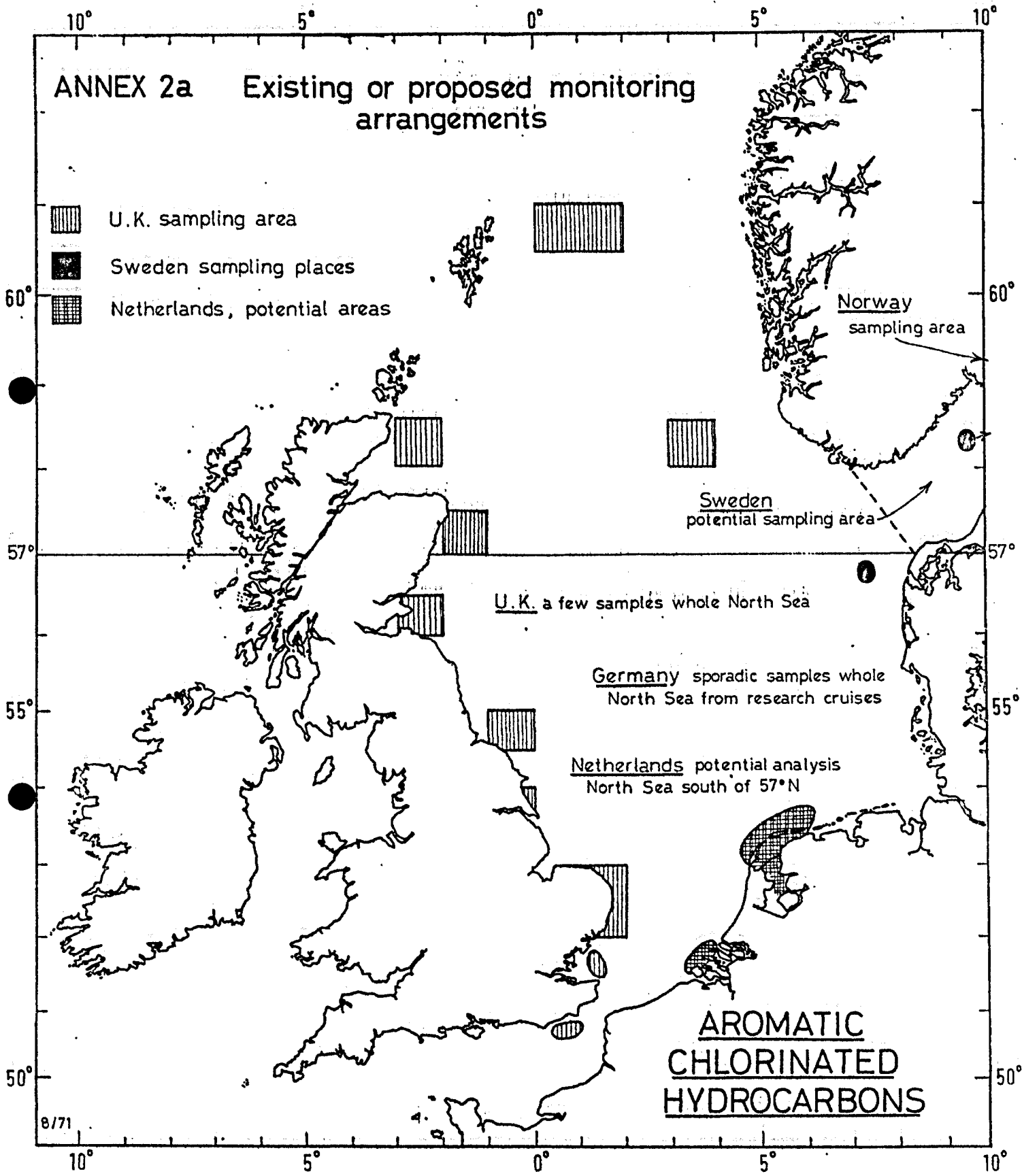
Mr T Williams                   MAFF, Fisheries Laboratory, Lowestoft, Suffolk

ICES

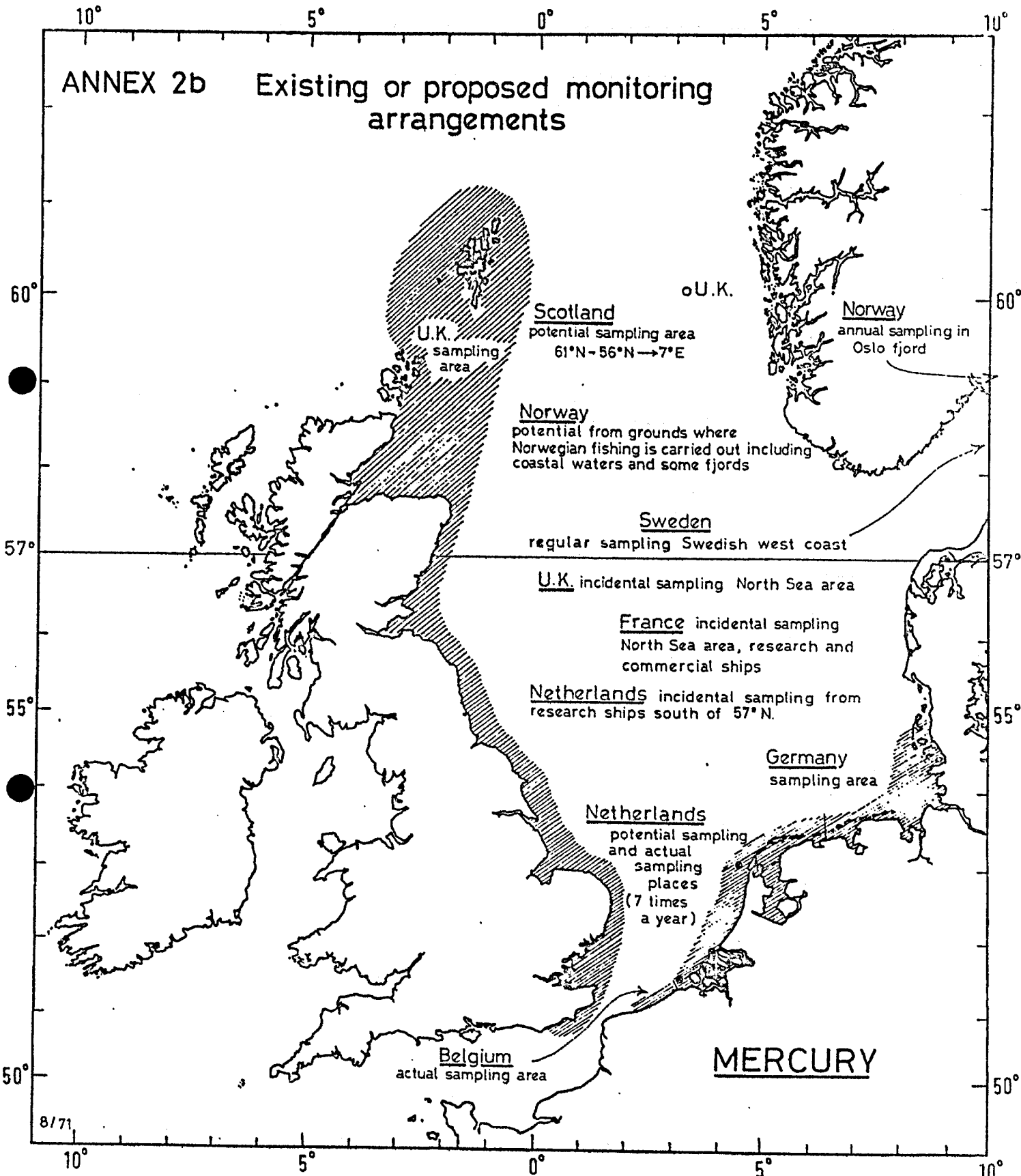
Mr Hans Tambs-Lyche,   General Secretary

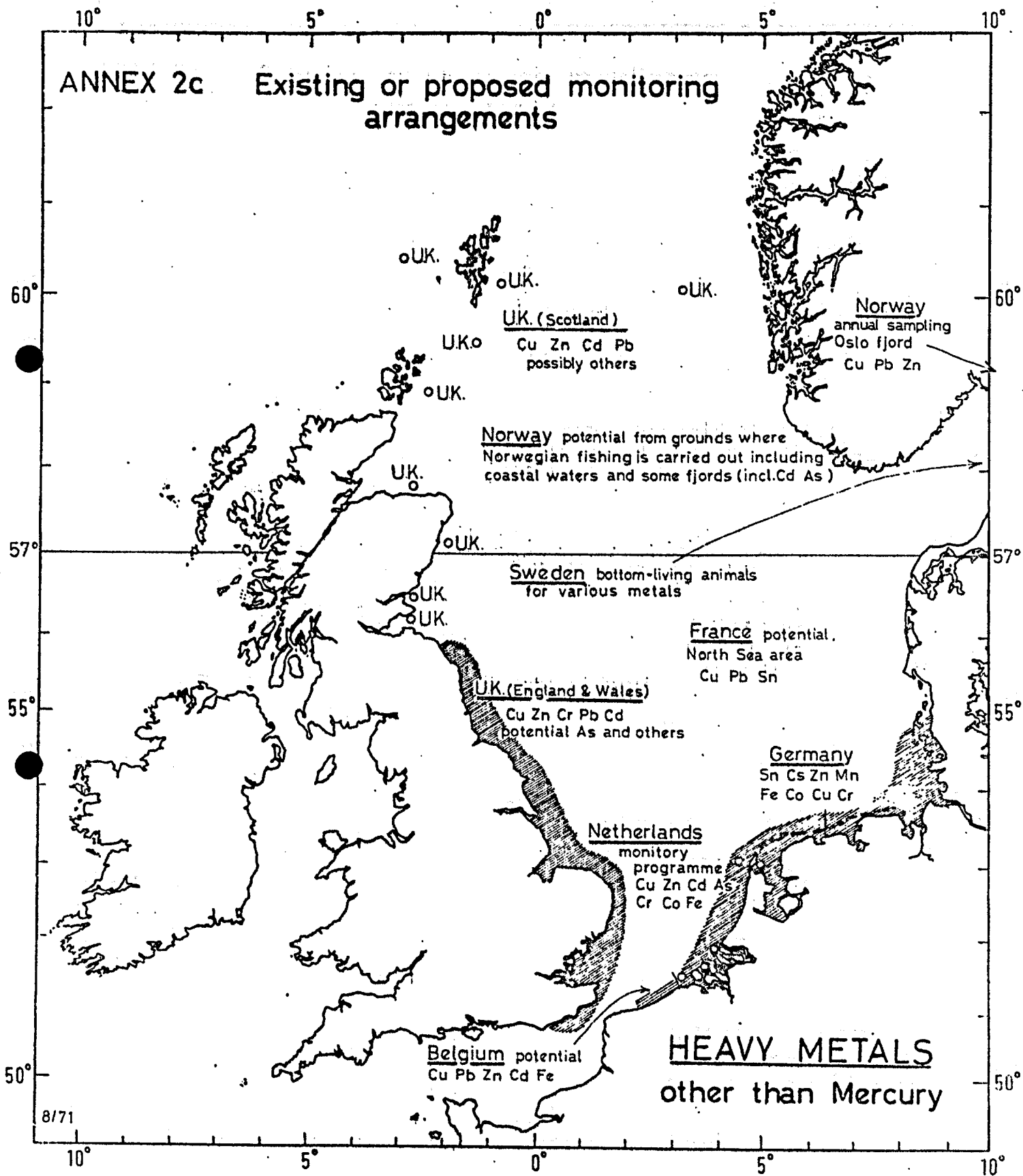
Mr J Møller Christensen

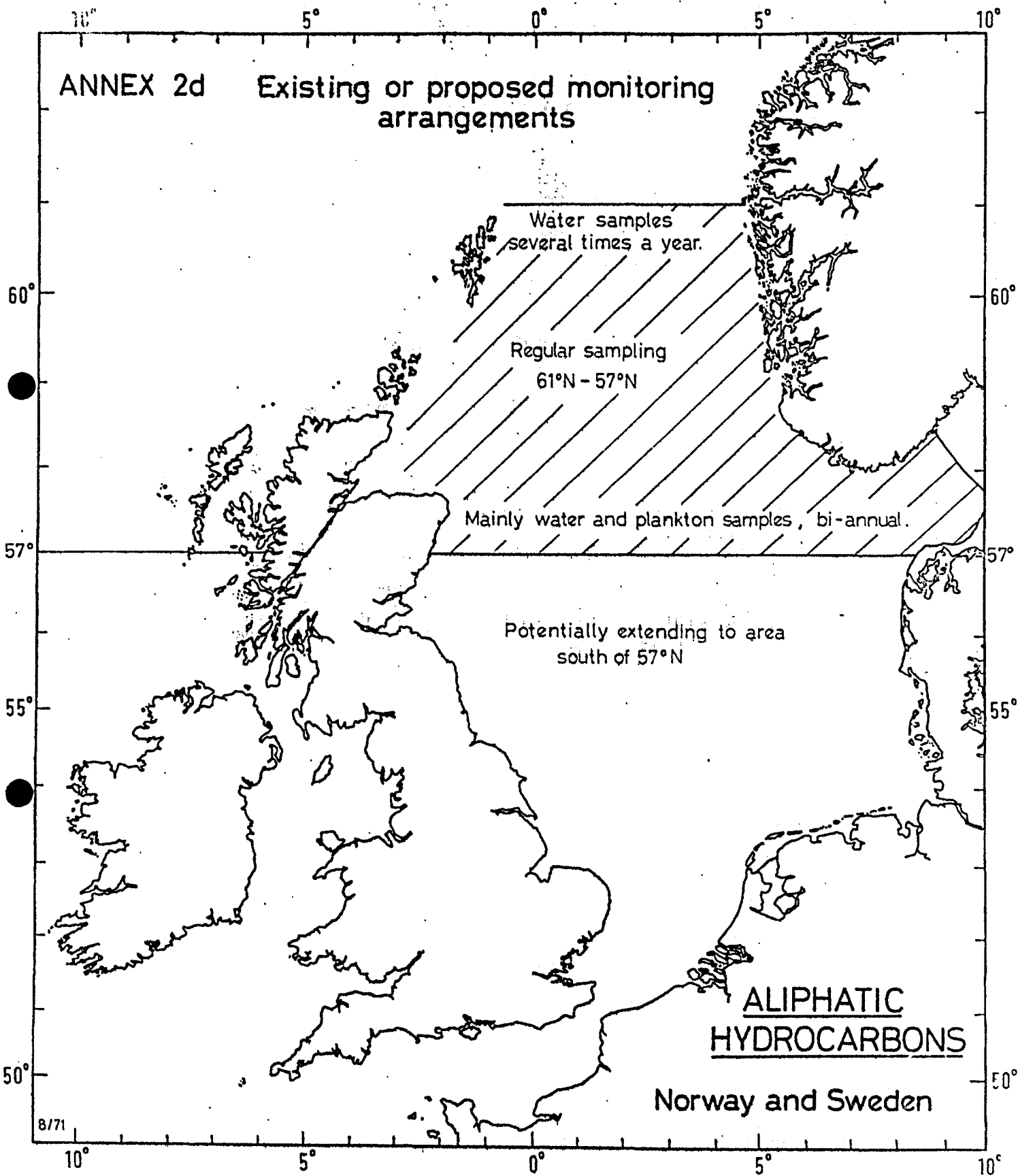




# ANNEX 2b Existing or proposed monitoring arrangements







ANNEX 3

The following details should be completed by the laboratories which will participate in the Base-Line Survey of pollutants in North Sea fish and shellfish. On the basis of the replies received, intercalibration samples will be sent to the laboratories concerned. The completed questionnaire should be returned not later than October 31 1971 to Dr J E Portmann

Ministry of Agriculture, Fisheries and Food  
FISHERIES LABORATORY  
BURNHAM-ON-CROUCH  
ESSEX  
ENGLAND

-----  
My laboratory will participate in the Base-Line Survey of pollutants in the North Sea Fish and Shellfish.

The analyst concerned with mercury and metal analysis will be .....  
The analyst concerned with chlorinated aromatic hydrocarbon analysis will be .....

Signed .....  
NAME TYPED ( \_\_\_\_\_ )  
Director of Laboratory

The full postal address of the laboratory is:

.....  
.....  
.....  
.....

---

ANNEX 4

Procedure for sampling and analysis of North Sea Fish and Shellfish Base-Line Study of Pollutants 1972

Sample size

The fish samples should consist of 10 individuals per species from any one area and the mussel and shrimp samples should consist of 100 individuals from each area.

Age of Specimens

Cod should be of the 1968 year class

Plaice should be of the 1968 year class

Herring should be of the 1969 year class

Shrimps should be 55 mm in overall length and should be unboiled and unpeeled.

Mussels should be of 55-60 mm preferably thin shelled and from commercial fisheries and uncooked.

Time of sampling

All the fish samples should be taken as early in 1972 as possible, preferably January or February.

All the shrimp and mussel samples should be taken in October-November, preferably of 1971 but failing this in October-November 1972.

(It is hoped to present the results at the 1972 Council Meeting).

Method of Storage

If storage is necessary, deep freezing in glass bottles or plastic bags is recommended. Notes should be kept of sample date, storage method, and analysis date.

Method of Analysis

The analytical methods are to be left to the discretion of the analyst concerned, but it is requested that the following procedures be adhered to. Ideally, analysis should be made of each individual specimen, but where this is not practicable, use an homogenate prepared from all 10 fish or all 100 shellfish. All results are to be expressed on a wet weight basis. Shrimps should be drained of excess water and analysed whole.

Mussels should be carefully removed from the shell, drained of excess shell liquor and analysed.

Herring and plaice - fillets to be analysed, the fillet to be taken full length of the fish and cut as close to backbone as possible.

Cod-fillets to be analysed, the fillet to be taken and cut as for herring and plaice. If for technical reasons it is not possible to analyse a whole fillet, a dorsal section can be used taken immediately behind the first dorsal fin.

All analyses are to be carried out in duplicate.