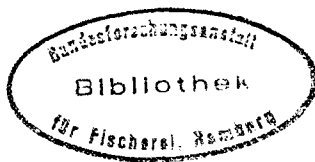


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International Council for the  
Exploration of the Sea

C.M.1993/E:9



**REPORT OF THE JOINT MEETING OF THE STEERING GROUP ON QUALITY ASSURANCE  
OF CHEMICAL MEASUREMENTS IN THE BALTIC SEA AND THE STEERING GROUP ON  
QUALITY ASSURANCE OF BIOLOGICAL MEASUREMENTS IN THE BALTIC SEA**

Gdynia, Poland, 16 March 1993

This document is a report of a Joint Meeting of two Study Groups of the International Council for the Exploration of the Sea and does not necessarily represent the views of the Council. Therefore, it should not be quoted without consultation with the General Secretary.

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# JOINT MEETING OF THE STEERING GROUP ON QUALITY ASSURANCE OF CHEMICAL MEASUREMENTS IN THE BALTIC SEA AND THE STEERING GROUP ON QUALITY ASSURANCE OF BIOLOGICAL MEASUREMENTS IN THE BALTIC SEA

Gdynia, Poland, 16 March 1993

## 1 OPENING OF THE MEETING

The meetings of the Steering Group on Quality Assurance of Chemical Measurements in the Baltic Sea and the Steering Group on Quality Assurance of Biological Measurements in the Baltic Sea were held on 16-19 March 1993 in Gdynia, Poland. The first day was devoted to a joint session between the two groups, which took place at the Sea Fisheries Institute in Gdynia. A list of participants in the Joint Meeting is attached as Annex 1 to this report.

For background information, ICES Council Resolutions 1992/2:39 and 2:40, as adopted by the 80th ICES Statutory Meeting, are attached as Annex 2 to this report.

The Joint Meeting was opened by the Director of the Sea Fisheries Institute, Dr Daniel Dutkiewicz. In his opening speech, Dr Dutkiewicz stressed the importance of international intercalibrations and quality assurance (QA) programmes.

Dr Uwe Harms, the Chairman of the Steering Group on QA of Chemical Measurements in the Baltic Sea, addressed the Joint Meeting and expressed gratitude to the government of Poland as well as to the Directors of the Sea Fisheries Institute, Dr Zbigniew Karnicki, and of the Institute of Meteorology and Water Management, Dr Zbigniew Dziedziszko, for the opportunity to hold these Steering Group meetings in Poland. He pointed out that in the field of analytical chemistry dramatic progress has been achieved during the past decade and that one major prerequisite of analytical reliability and comparability is the design and implementation of an adequate analytical quality assurance system. Furthermore, he mentioned that Germany has offered to organize a HELCOM/ICES Workshop on Quality Assurance of Chemical Measurements for the Baltic Monitoring Programme from 5-8 October 1993 in Hamburg.

## 2 ADOPTION OF THE AGENDA

The meeting adopted the agendas of the Joint Meeting and of the separate meetings of both Steering Groups. The agenda of the Joint Meeting is attached as Annex 3, while the agendas for the separate meetings of the Steer-

ing Groups are attached as annexes to the respective meeting reports.

## 3 ELECTION OF A CHAIRMAN FOR THE JOINT MEETING OF THE STEERING GROUPS

Dr Uwe Harms, Chairman of the Steering Group on Quality Assurance of Chemical Measurements in the Baltic Sea, was invited to act as Chairman for the Joint Meeting. Dr Harms accepted this invitation.

## 4 APPOINTMENT OF RAPPORTEURS

Ms Eeva-Liisa Poutanen, Environment Secretary of the Helsinki Commission, acted as rapporteur for the Joint Meeting as well as for the meeting of the Steering Group on Quality Assurance of Chemical Measurements. Mr Torkel G. Nielsen, Denmark, acted as rapporteur for the meeting of the Steering Group on Quality Assurance of Biological Measurements.

## 5 INFORMATION PRESENTED BY HELCOM, ICES AND OTHER MEMBERS OF THE GROUP

Ms Poutanen, Environment Secretary of HELCOM, informed the meeting about the recent decisions made by the Environment Committee and the Helsinki Commission with regards to intercalibrations and quality assurance. She also provided an updated list of contact persons for the HELCOM *ad hoc* Working Groups on Chemical and Biological Quality Assurance as well as contact addresses of institutes and laboratories collecting BMP data. Appropriate extracts are attached as Annex 4 to this report.

The Joint Meeting also considered section 12 ("Intercalibration exercises and quality assurance procedures") of the 1992 Report of the ICES Advisory Committee on Marine Pollution.

The Joint Meeting made special note of the decision by HELCOM as stated in its report (HELCOM 14/18, Paragraph 5.24):

*"The Commission urged the Contracting Parties to participate in the Quality Assurance exercises whenever possible and decided that the participation in the QA- exercises is mandatory for the laboratories providing BMP data on parameters included in the mandatory part of the Baltic Monitoring Programme."*

The Joint Meeting also took special note of the second paragraph of section 12.7 of the 1992 ICES ACMP Report:

*"It is essential that HELCOM and ICES data banks are fed with good quality data from all BMP laboratories and that a mechanism is established to check or possibly even refuse data from countries/laboratories not qualified by international intercomparisons."*

The Joint Meeting recognized that a list of certified or standard marine reference materials, including the companies that prepare and sell these materials, is available under section 16 of the QUASIMEME Manual (Guidelines on Quality Assurance for Marine Measurements with Special Reference to the Mandatory Determinants of the North Sea Task Force and the Joint Monitoring Programme of the Oslo and Paris Commissions, prepared by G. Topping, D.E. Wells and B. Griepink). More detailed discussion about reference materials was carried out during the separate meeting of the Steering Group on QA of Chemical Measurements.

Ms Jill Merry, Water Quality Institute, Denmark, offered to provide some information about an existing data bank on reference materials for further distribution by the HELCOM Secretariat.

The HELCOM Secretariat was asked to contact Dr B. Griepink at the Community Bureau of Reference (BCR) of the European Community for further information concerning the so-called EC-"PHARE" programme. This programme may provide opportunities to obtain finances so that non-EC/EFTA countries can take part in international QA projects.

The Joint Meeting, noting the list of contact persons and laboratories responsible for BMP analyses (contained in Annex 4), encouraged the experts from different countries to have close contacts with each other.

The Joint Meeting also considered the proposal to have reference laboratories. Due to complicated financial demands, no final decision could be made, however, the Joint Meeting recommended that this topic be considered further at the Workshop in Hamburg.

The representative of ICES, Mr Jan René Larsen, stressed that the aspects of QA set forth by HELCOM are in accordance with the advice of ICES. In addition, he explained the general interest of ICES in quality assurance programmes and, in this context, he mentioned that ICES has organized a number of international intercalibration/intercomparison exercises. He also requested that the Joint Meeting discuss matters related to data delivery and QA issues.

The Chairman of the Steering Group on Quality Assurance of Biological Measurements in the Baltic Sea, Dr Lars Herroth, gave his views on QA issues. He stressed that information on precision and accuracy is essential for a realistic assessment of environmental conditions. He also emphasized the importance of all laboratories participating in QA programmes as no one authority has a monopoly on the truth. Requests for reliable and comparable data are coming from both scientists and funding agencies.

## 6 CLOSING OF THE MEETING

The Joint Meeting was then closed and the two Steering Groups met separately for the rest of the week.

## ANNEX 1

### LIST OF PARTICIPANTS

Members of the Steering Group on Quality Assurance of Biological Measurements in the Baltic Sea are marked by the symbol (BIOL) behind their names. Members of the Steering Group on Quality Assurance of Chemical Measurements in the Baltic Sea are marked by the symbol (CHEM).

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## ANNEX 2

### COUNCIL RESOLUTIONS

#### C.Res.1992/

2:39

A Steering Group on Quality Assurance of Chemical Measurements in the Baltic Sea will be established under the chairmanship of Dr U. Harms (Germany) and will meet in Gdynia, Poland, from 16-19 March 1993 to:

- a) prepare final plans for the ICES/HELCOM Workshop on Quality Assurance of Chemical Analytical Procedures for the Baltic Monitoring Programme (Hamburg, 5-8 October 1993), including issues concerning the need for equipment and specific certified reference materials;
- b) review and report on the existing capabilities of laboratories in the Baltic countries with regard to analyses of the types of contaminants and media to be covered in the Workshop;
- c) review the sections of the BCR quality assurance manual in relation to the Guidelines for the Baltic Monitoring Programme and identify the relevant QA requirements for each BMP monitoring parameter.

The Steering Group will meet with the Steering Group on Quality Assurance of Biological Measurement in the Baltic Sea during the first day of the meeting.

2:40

A Steering Group on Quality Assurance of Biological Measurements in the Baltic Sea will be established under the chairmanship of Dr L. Hernroth (Sweden) and will meet in Gdynia, Poland, from 16-19 March 1993 to:

- a) agree on the overall aims of the Steering Group and coordinate them with those of the Steering Group on Quality Assurance of Chemical Measurements in the Baltic Sea;
- b) draft a plan of action for the Steering Group, including the topics that should be covered, relevant activities, and a tentative timetable;
- c) decide on ways to link the work of the Steering Group to that on the revision of the BMP Guidelines and to the relevant working groups within HELCOM, EC, Baltic Marine Biologists, and ICES;
- d) propose ways for funding the activities of the Steering Group.

The Steering Group will meet with the Steering Group on Quality Assurance of Chemical Measurements in the Baltic Sea during the first day of the meeting.

## ANNEX 3

### AGENDA

1. Opening of the Joint Meeting by local organizers at the premises of the Sea Fisheries Institute (SFI), Gdynia.
  - Welcoming address by the director of SFI, Mr Daniel Dutkiewicz.
  - Welcoming address by Dr Uwe Harms (Germany) on behalf of the members of the Steering Groups.
2. Adoption of the agendas.
3. Invitation to Dr Uwe Harms to chair the meeting.
4. Appointment of rapporteurs.
5. Information presented by HELCOM and ICES representatives and by other members of the group.
6. Closing of the meeting.



## ANNEX 4

### EXTRACTS OF INFORMATION PRESENTED BY THE REPRESENTATIVE OF THE HELSINKI COMMISSION

#### Tasks for the Helsinki Commission *Ad Hoc* Working Groups on Chemical and Biological Quality Assurance

The duties of the *ad hoc* Working Groups for Chemical and Biological Quality Assurance (QA) are:

- to coordinate the development and implementation of a QA programme for laboratories participating in the Baltic Monitoring Programme;
- to give guidance on practical questions relating to QA;
- to give guidance on how QA data should be used in relevant assessment work;
- to participate in, and to give advice on, the revision of the Guidelines for the Baltic Monitoring Programme for the Fourth Stage;
- to prepare QA guidelines for the relevant measurements;
- to identify relevant reference materials and to organize together with the Secretariat the distribution of those materials to laboratories participating in the Baltic Monitoring Programme;
- to identify the costs associated with QA;
- to report on progress of QA annually to the Environment Committee and to make proposals for action by the Commission.

#### Extract from the Report of the 14th Meeting of the Helsinki Commission (HELCOM 14/18, Paragraphs 5.24-5.26)

##### d) Matters related to the Baltic Monitoring Programme and data banking

5.24 The Commission urged the Contracting Parties to participate in the Quality Assurance exercises whenever possible and decided that the participation in QA exercises is mandatory for the laboratories providing BMP data on parameters included in the mandatory part of the Baltic

Monitoring Programme (EC 3/17, Paragraphs 6.5-6.6).

5.25 The Commission, appreciating the offer by Germany, decided that a Workshop on Quality Assurance of Analytical Procedures for the Baltic Monitoring Programme will be organized in Hamburg, Germany, 5-8 October 1993, as a joint effort between HELCOM and ICES (EC 3/17, Paragraphs 6.10-6.11) and further decided that part of the funds allocated in the previous HELCOM budget (HELCOM 12/15) for reference materials for BMP laboratories can be used to support the travel and daily subsistence allowances of some participants of the Quality Assurance Workshop in Hamburg (EC 3/17, Paragraph 6.16).

5.26 The Commission took note that the Guidelines on QA prepared by the Community Bureau of Reference (BCR) of the European Community are available to HELCOM laboratories; and at a minimum, one laboratory from every Contracting Party and the Observer Country Latvia will be able to participate in the BCR QA programme (QUASIMEME) and will be provided with all documentation and samples; and the data will be evaluated and the countries be invited to participate in the meetings; however, non-EC countries must attend meetings at their own expense. The Commission urged the Contracting Parties to request those laboratories providing BMP data, but not having confirmed their participation yet, to do so as soon as possible.

#### Extract from the Report of the Third Meeting of the HELCOM Environment Committee (EC 3/17, Paragraphs 6.2-6.23):

##### a) Intercalibrations and quality assurance

6.2 The ICES Observer introduced the advice of ACMP concerning the intercomparison exercises and the quality assurance procedures (EC 3/6a/4). The document contains information on the ICES/IOC/OSPARCOM Intercomparison Programme on the Analysis of Chlorobiphenyls in Marine Media as well as the information on intercomparison programmes on PAHs, trace

metals in SPM, nutrients, etc. In the case of the intercomparison programmes on chlorobiphenyls and PAHs, the coordinators will apply a "participants-to-pay" principle in order to cover the manpower costs associated with the exercise; ICES will continue to cover the costs of materials. The document also provides general information on quality assurance of marine sampling operations.

6.3 The Meeting requested the *ad hoc* Working Group on Quality Assurance to discuss the details given in the draft 1992 ACMP report.

6.4 The ICES Observer also pointed out that the intercomparison exercise on the analyses of trace metals in SPM is also relevant for river water measurements.

6.5 The Meeting stressed the importance of intercomparison exercises and urged the Contracting Parties to participate in the QA exercises whenever possible.

6.6 Furthermore, the Meeting proposed that the participation in QA exercises should be mandatory for those laboratories providing BMP data on parameters included in the mandatory part of the Baltic Monitoring Programme.

6.7 The Meeting, recalling the request by EC 2 (EC 2/19, Paragraph 6.7) to approach the Community Bureau of Reference (BCR) of the European Community in order to make BCR Guidelines on QA available to HELCOM laboratories, appreciated the positive reply from the Commission of the European Communities (EC 3/6a/5).

6.8 Recalling also the request by EC 2 (EC 2/19, Paragraphs 6.6 and 6.7) concerning the participation of HELCOM laboratories in the BCR QUASIMEME programme, the ICES Observer informed the Meeting that, at a minimum, one laboratory from every Contracting Party to the Helsinki Convention and the Observer Country Latvia will be provided with all documentation and samples, the data will be evaluated and the respective countries will be invited to participate in the meetings. However, non-EC countries must attend meetings at their own expense.

6.9 The ICES Observer introduced a proposal for a HELCOM Workshop on Quality Assurance of Analytical Procedures for the Baltic Monitoring Programme (EC 3/6a/1).

6.10 The Committee appreciated the offer of Germany to organize the workshop and welcomed

the offer by ICES to have the workshop as a joint effort between HELCOM and ICES.

6.11 The Committee, stressing the importance of having such a workshop decided to organize the workshop in Hamburg, Germany, from 4-7 October 1993 during the week preceding the fourth meeting of the EC.

6.12 The Meeting supported the proposal by the convener of the *ad hoc* Working Group to invite Mr Graham Topping to act as Chairman for the Workshop and expressed its appreciation to ICES for the offer to cover the travel expenses of the Chairman.

6.13 With regards to the content of the Workshop, the Meeting endorsed the proposal made by Mr Topping on the principal aims of the Workshop as shown in Annex 8 of this Report.

6.14 The Meeting requested ICES to prepare a detailed programme of the workshop in the steering group meeting in March 1993 which was agreed to be sent to the Contracting Parties for further comments and proposals.

6.15 The Committee emphasized the importance that all Contracting Parties to the Helsinki Convention participate in the workshop and stressed that participants should be persons actually conducting these analyses in the laboratory.

6.16 The Environment Secretary informed the EC that FIM 50 000 had been allocated in the HELCOM budget for reference materials for BMP laboratories to support the quality assurance work for chemical measurements. Unfortunately, so far, she had not received any guidance on how this money should be spent. This matter was subsequently addressed by the drafting group on quality assurance and the following recommendations were made to the EC for its approval and endorsement:

a) The QA Steering Group on Chemical Measurements, at its next meeting in March 1993, must identify the specific certified reference materials (CRMs) for the mandatory measurements to be done under BMP, and the amounts of each CRM that needed to be purchased by HELCOM.

b) The CRMs purchased by HELCOM should be distributed to those laboratories from Contracting Parties which currently have limited resources for such purchases.

c) In view of the limited resources of some Contracting Parties, HELCOM should take the unusual step of allocating part of FIM 50 000 to supporting the travel and subsistence of some analysts in relation to the Quality Assurance Workshop for Chemical Measurements (Hamburg, October 1993).

- 6.17 The Meeting, recalling the request of EC 2 (EC 2/19, Paragraph 6.12) concerning the practical questions related to the establishment of the reference laboratories for various determinands measured in the BMP, noted the proposal submitted by Denmark (EC 3/6a) and requested the *ad hoc* Working Group on Chemical Quality Assurance to consider the proposal in detail.
- 6.18 The Meeting noted the contact addresses of institutes and laboratories collecting BMP data (EC 3/6a/2, EC 3/6a/Corr.1 and EC 3/6a/Add. 1) and noting the lack of information from one country stressed the need for all Contracting Parties to submit the names of laboratories and persons responsible for the BMP data to the Secretariat as soon as possible for further transmission to the Conveners of the *ad hoc* working groups on chemical and biological quality assurance. The updated list of the contact addresses of institutes and laboratories collecting BMP data is attached as Annex 9 to this Report.
- 6.19 The Delegation of Russia agreed to provide the missing information before the end of October 1992.
- 6.20 The Committee appreciated the information submitted on biological quality assurance (EC 3/6a/3) and noting the insufficient nomination of the contact persons by the Contracting Parties to the working group requested the Contracting Parties to inform the Secretariat as soon as possible, but not later than 15 November 1992 about their national contact persons.
- 6.21 The Meeting thanked ICES for the advice on matters related to quality assurance and the conveners of the *ad hoc* Working Groups for their work.
- 6.22 The Meeting, appreciating the information given in document EC 3/6a/6 asked the Contact persons of the EC to distribute the paper further to the laboratories working for the Baltic Monitoring Programme.
- 6.23 The Swedish Delegation informed that in the process of revising the national monitoring programme the Swedish Environmental Protection

Agency will require participating laboratories to obtain formal accreditation for chemical analysis of sea water. The Swedish Board for Technical Accreditation has developed a management system under which laboratories are requested to participate in annual intercomparison exercises, feedback (positive as well as negative) is given to the laboratories and, if they fail to fulfill the quality requirements, the accreditations can be cancelled.

**Extract from the Report of the Third Meeting of the HELCOM Environment Committee (EC 3/17, Annex 8):**

#### **Workshop on the Quality Assurance of Chemical Measurements**

Following examination of the preliminary proposal by Dr Uwe Harms for the above workshop, further details were elaborated to assist the Steering Group on Quality Assurance of Chemical Measurements in the Baltic in the design of the final plans for the workshop at its first meeting (Gdynia, Poland, 16-19 March 1993).

Although the EC agreed that the workshop should give priority to the measurements of contaminants which formed part of the mandatory programme of the BMP, in view of the limited time and resources available for the workshop, it was accepted that the workshop should concentrate on the quality assurance aspects of nutrients in sea water and metals in biota, and that the participants should mainly consist of analysts who are responsible for producing the BMP data.

Matters relating to measurements for other mandatory contaminants, e.g., organochlorine compounds in tissue, will be restricted to presentations on the state-of-the-art procedures for sampling and analysis of these compounds.

It was also recognized that there was a need for managers of monitoring programmes to also attend in order to provide an opportunity for them to understand the importance of including QA work in their programmes.

It was agreed that the Steering Group on Quality Assurance of Chemical Measurements in the Baltic should ensure that the following aspects were covered in the workshop:

- i) the importance and design of sampling strategies so that the aims of monitoring work can be achieved;
- ii) the need for, and description of, collection procedures which assure that representative and uncontaminated samples are obtained;

- iii) the need for, and description of, storage and pre-treatment procedures, which maintain the integrity of samples prior to their analysis;
- iv) the instrumental procedures which provide measurements of the required accuracy and precision;
- v) the design and implementation of an in-house (i.e., within the laboratory) quality control procedure to ensure that daily measurements fall within acceptable limits of accuracy and precision as specified under (iv);
- vi) the need for, and description of, documented procedures for (v) so that laboratories can provide HELCOM data assessment groups with relevant QA data;

- vii) the role and use of certified reference materials under (v) and the preparation and use of uncertified reference materials (sometimes referred to as laboratory or in-house reference materials).

It was agreed that the coordinating committee should do its best to arrange that the lecturers at the workshop prepare written presentations in advance of the workshop and distribute these and other relevant documents to participants before the workshop. This would enable participants to have sufficient time to examine the material before they arrive, and thus be in a better position to take full advantage of the workshop.

It was also agreed that presentations at the meeting should address those problems currently encountered by the less experienced laboratories in field and laboratory work and should provide practical advice accordingly.

**CONTACT PERSONS RESPONSIBLE FOR BMP ANALYSES**

Type of data	Country/Contact person		
	Denmark	Estonia	Finland
<b>1. Physical and chemical determinands</b>			
Basic hydrographic and hydrochemical determinands	G. Ærtebjerg (1)	T. Poder (3)	M. Pertillä (6) (HYDRO) K. Mäkelä (6) (CHEMIE)
Organic substances (petroleum hydrocarbons and chlorinated hydrocarbons)	M. Cleeman (2)	A. Talvari (3)	H. Kankaanpää (6) R. Parmanne (8) (FISH SAMPL.& AGE)
Harmful inorganic substances	B. Pedersen (1)	H. Jankowski (3)	M. Leivuori (6) R. Parmanne (8) (FISH SAMPL.& AGE)
<b>2. Biological determinands</b>			
Phytoplankton and related microorganisms	H. Kaas (1)	A. Jaanus (3)	K. Kokonen (6)
Zooplankton	T.G. Nielsen	M. Simms (3)	H. Kuosa (6)
Macrozoobenthos	A. Josefson (1)	I. Kotta (3)	A.-B. Andersin (6)
Microbiology	G. Ærtebjerg (1)	K. Künnis (5)	J. Kuparinen (6)
<b>3. Environmental data on radioactive substances</b>		H. Putnik (4)	E. Illus (7)
<b>4. BMP coordinators and data receivers</b>	P. Sandbeck (1)	U. Lips (3)	R. Olsonen (6)

Type of data	Country/Contact person		
	Germany	Latvia	Lithuania
<b>1. Physical and chemical determinands</b>			
Basic hydrographic and hydrochemical determinands	D. Nehring (9) M. Michelsen (9) (HYDRO) M. Matthäus (9) (HYDRO) H.P. Hansen (10) D. Körner (13) E. Brandt (14) M. Michelsen (14) F. Schulz (14)	M. Kalejs (17) V. Berzins (17) Y. Zaharchenko (18) A. Jurkovskis (18) A. Andrushaitis (19)	G. Griksas (20) N. Remeniukas (20)
Organic substances (petroleum hydrocarbons and chlorinated hydrocarbons)	J.C. Duinker (10) O. Rechlin (11) E. Huschenbeth (12) G. Dahlmann (13) M. Theobald (13) H. Gaul (13) T. Petenati (14)	A. Jurkovskis (18) V. Platpira (19)	J. Sukyte (21) S. Zareckas (23)
Harmful inorganic substances	U. Harms (12) D. Schmidt (13) H. Albrecht (13) G. Rüniger (14)	Z. Seisuma (19) A. Jurkovskis (18)	K. Kvietkus (23) R. Taraskevicius (24)
<b>2. Biological determinands</b>			
Phytoplankton and related microorganisms	U. Horstmann (10) J. Göbel (14)	M. Balode (19) A. Andrushaitis (19)	I. Olenina (20)
Zooplankton	G. Breuel (19) G. Behrens (10)	R. Laganovska (19)	V. Balcius (20)
Macrozoobenthos	H. Rumohr (10) J. Voss (14) F. Gosselck (15)	G. Lagzdins (19)	S. Ciubarova (20)
Microbiology	H. Giesenhagen (10)	V. Platpira (19) S. Apine (19)	Z. Stukova (20)
<b>3. Environmental data on radioactive substances</b>	G. Kanisch (12) J. Hermann (13)		S. Motiejunas (21)
<b>4. BMP coordinators and data receivers</b>	S. Wilhelms (16) (not for MORS data)	A. Jurkovskis (18)	A. Stankevicius (20)

Type of data	Country/Contact person		
	Poland	Russia	Sweden
<b>1. Physical and chemical determinands</b>			
Basic hydrographic and hydrochemical determinands	A. Trzozinska (25) B. Cyberska (25)		S. Carlberg (33)
Organic substances (petroleum hydrocarbons and chlorinated hydrocarbons)	W. Slaczka (25) M. Protasowicki (26)		S. Carlberg (33) (PETR.HYDROC.) A. Bignert (35) (FISH,ETC.) B. Jansson (36) (HALOGEN,HYDROC.)
Harmful inorganic substances	W. Slaczka (25) J. Woron (25) M. Protasowicki (26)		A. Göthberg (37)
<b>2. Biological determinands</b>			
Phytoplankton and related microorganisms	P. Ciszewski (27) S. Ochocki (28)	A. Tsiban (30)	T. Willén (34) U. Grimås (34)
Zooplankton	P. Ciszewski (27)	A. Tsiban (30)	T. Willén (34) U. Grimås (34)
Macrozoobenthos	P. Ciszewski (27)	A. Tsiban (30)	H. Cederwall (38) (BENTHIC FAUNA)
Microbiology	P. Ciszewski (27)	A. Tsiban (30)	
<b>3. Environmental data on radioactive substances</b>	D. Grzybowska (29)	Y. Panteleev (32)	M. Notter (37)
<b>4. BMP coordinators and data receivers</b>	E. Andrulewicz (25)		J. Szaron (33)

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