Marine Environmental Quality Committee

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REPORT OF THE

WORKING GROUP ON THE BALTIC MARINE ENVIRONMENT

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International Council for the Exploration of the Sea

Conseil International pour l'Exploration de la Mer

Palægade 2–4 DK–1261 Copenhagen K Denmark

BACKGROUND

As stated in ICES C.Res.1996/2:27, the Working Group on the Baltic Marine Environment (WGBME) was to work by correspondence in 1997 to:

a) review the results of the Sediment Baseline Study of Contaminants in Baltic Sea Sediments, including the recommendation for future sediment monitoring in the Baltic Sea, and provide comments and proposals to ACME before its June 1997 meeting;

b) consider the QA requirements of physical oceanographic parameters specific to the Baltic Sea.

WGBME will report to MEQC at the 1997 Annual Meeting.

Term of reference (a)

As several WGBME members have been closely connected to the development of the final report of the Sediment Baseline Study, the recommendations included in it can probably be understood as also being supported by WGBME. The draft Sediment Baseline Study (version 6.0) was submitted as requested for consideration by the Advisory Committee on the Marine Environment (ACME).

The WGBME supports the recommendations mentioned in the final report of the Sediment Baseline Study concerning the starting and conduct of a programme of repeated baseline studies instead of an annual sediment monitoring programme. The suggested interval of five years seems appropriate. Although this interval may be too small for changes to be detected in many places, it helps to maintain laboratory experience on this kind of sampling and analysis. The Sediment Baseline Study recommendations are contained in Annex 1.

Term of reference (b)

The QA requirements of physical oceanography should, in the view of the WGBME Chairman (Dr M. Perttilä), at this stage be restricted to CTD (conductivity/temperature/depth) observations. The QA concept has developed in a few short years from simple intercomparisons into an institution, and probably we should not go too much into detail concerning the required QA procedures.

QA System

In brief, a QA system should include the components described below:

- personnel requirements (e.g., recruitment, training, tasks, responsibilities, feedback) are to be documented;
- technical documentation (sampling methods, analysis methods, database description, instrument manuals, documents on supporting equipment (e.g., air filtering, balances, thermometers, etc.)); special efforts should be devoted to the validation of the methods, including the evaluation of uncertainty;
- equipment and consumable requirements are to be documented;
- equipment maintenance is to be planned and documented (e.g., calibration intervals);
- laboratory environment requirements and their surveillance are to be documented;
- internal and external quality control is to be planned and documented;
- laboratory quality management is to be documented (use of work sheets, x-graphs, feedback, audits, etc.).

The above QA system should be entirely documented in a so-called 'Quality Manual'. The important thing to note is that the laboratory itself defines the 'degree of quality', specifies it in the 'Quality Manual', submits the system for outside auditing, and follows the written procedures, documenting the critical steps of a procedure (e.g., sampling or analysis) in such detail that the procedure can be retraced afterwards. A very readable general review on QA systems has now been

distributed for comments in the Draft HELCOM Guidelines for the Baltic Monitoring Programme (BMP). However, in this publication there are no specific CTD protocols.

In most countries, there is a national supervisory body responsible for annually checking that the requirements and procedures defined in the 'Quality Manual' are followed. The capability of the national body to carry out such inspections is in turn inspected by an international body (the International Board of Accreditation).

In corollary, it may be noted that QA means much more than just simple participation in intercomparison excercises. This renders somewhat questionable the efforts of, e.g., ICES and HELCOM simply to collect QA material. Even though these organizations have at present a group to set up the QA protocols in relation to monitoring, these groups are probably not meant to be permanent. The QA system requires documentation and inspection of all aspects of the sampling/laboratory work. Most of the inspection work will be done within the institutes themselves, by means of a regular auditing system, and the external inspection is usually provided by a national accreditation centre, which is an independent institution. If a country does not have an established QA institution, this service can be provided by others at a reasonable cost. ICES and HELCOM are not independent institutions, and there seems to be no intention to submit their internal QA (that is, their system of documentation, competence to handle data, and draw conclusions on the basis of the quality of the data) to an outside, independent auditing body. Moreover, there is little reason to waste resources duplicating the work already done on a national basis.

As for the CTD measurements, the WBME working by correspondence obviously cannot do much. Most of the relevant ICES literature becomes available after, e.g., the ACME meeting in June, meaning that in practice the information can only be circulated at the end of summer. As a report is required in early autumn, very little time is left to do the actual work. However, it appears that in the field of QA formalism, the ICES/HELCOM Steering Group on the Quality Assurance of Chemical Measurements in the Baltic Sea (SGQAC) is doing a very good job. The group has reported a quite comprehensive quality review from their last spring meeting. This review actually is what is called a quality manual, irrespective of the parameters.

Obviously the WGBME cannot now start writing a CTD procedure protocol. Instead, the group recommends that ICES wait for the final outcome of SGQAC. If needed, the CTD quality assurance procedures can be derived from the QA manual with little effort.

Finally, the WGBME recommends that it be disbanded. The ICES structure has changed radically in recent years. There now is a specific committee to deal with Baltic Sea issues, and this new committee should be allowed to start with a clean slate. An interdisciplinary Working Group such as the WGBME may not be appropriate for future work.

ANNEX 1

RECOMMENDATIONS FROM THE SEDIMENT BASELINE STUDY

It must be emphasized that the chemical results, as well as the mineralogical and age determination data, contain a large amount of information. Further inspection of this data will probably open new interpretations. However, based on the present survey of the dating, chemistry and mineralogy of the cores, the following observations can be made on the use of sediments in the follow-up of contaminants in the Baltic Sea marine environment.

- A reliable set of sediment parameters has been established, covering the major sedimentation basins of the Baltic Sea.

- Sediments give valuable information on the development of contaminant status at least in certain areas, and thus can be included in the pollution monitoring programme of HELCOM. Monitoring, in this sense, is to be primarily understood as a programme of repeated baseline studies. The main use of the sediments, however, is to indicate areal variations rather than variations in time.

- Sediments respond slowly to input changes. Frequency of sampling for possible monitoring/baseline studies should therefore not be higher than once in five years.

- Some of the regions sampled during the Sediment Baseline Study should be investigated again to find better sampling sites; this is particulary the case for the Kattegat, the Bornholm Basin, the Arkona Basin, and the northern central Baltic Proper.

- A selected set of Sediment Baseline stations appear to be suitable (Figure A1.1) for use as future reference stations.

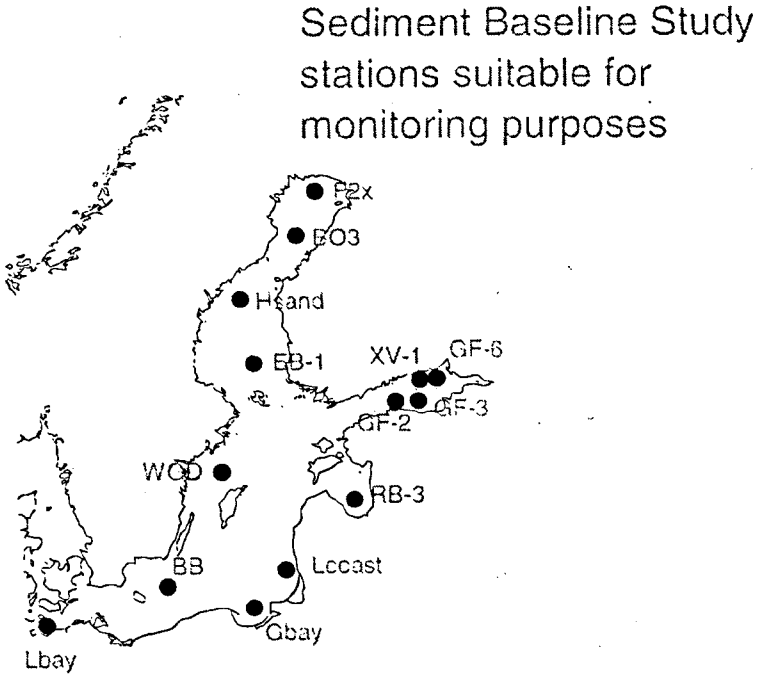

Figure A1.1. Location of stations suitable for long-term monitoring.

- The monitoring should be carried out as a joint Baseline Study, assigning only recognized expert laboratories (laboratories with formal accreditation and/or quality assurance systems checked by external interlaboratory tests) to carry out the analysis of the samples. Only equipment to be specified in this report should be used for sampling.

- Utmost care should be excercised in the precise positioning of the ship for sediment sampling, and in the accuracy of the position holding. The positioning and ship-holding techniques should allow a navigational accuracy of ±20 m or better.

- The sediment cores should be documented by description and by photographs.

- Samples for post-cruise analyses should be deep-frozen immediately after sampling (except those intended for possible mineralogical and grain-size analysis). Analysis of authigenic minerals formed in anoxic conditions should be performed in a manner preventing alteration through oxidation.

- The total sample should be used (no size fractionation).

- For the trace elements, total digestion should be used.

- The primary elements to be analysed are Al (or Li), As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Zn.

- The primary organochlorine compounds are PCBs (the congeners used in the HELCOM BMP), PAHs, PBDEs, and the DDTs. Moreover, the sum parameters EOX and AOX should also be analysed.

- The supporting parameters are P, N, TC, TOC and the near-bottom water salinity.