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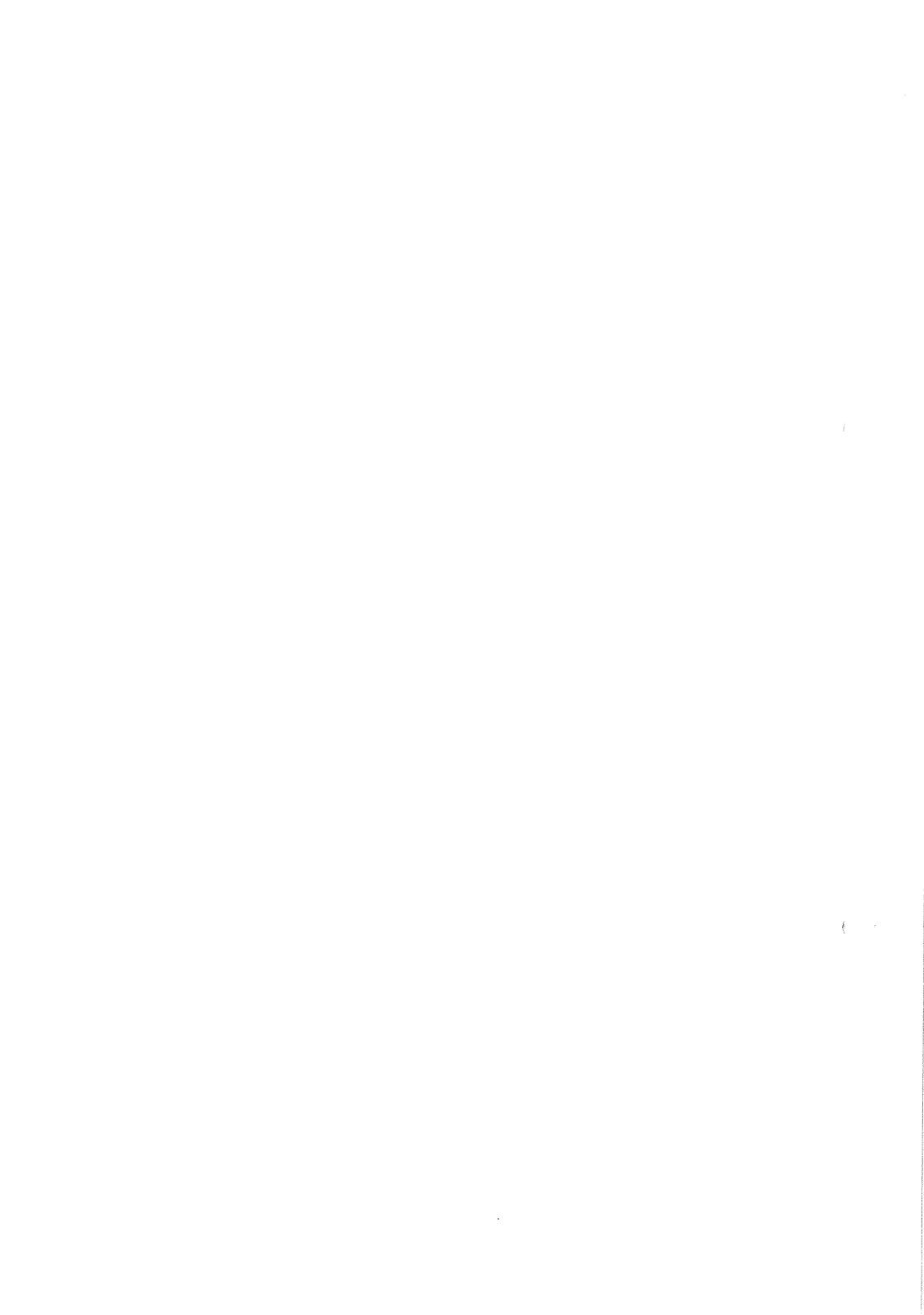
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*REPORT OF THE JOINT MEETING OF BIOLOGISTS AND CHEMISTS
CONCERNED WITH CONTAMINANTS IN MARINE MAMMALS*

Copenhagen, 12 - 13 February 1987

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1 OPENING OF MEETING

The Chairman, Dr L. Reutergårdh, opened the meeting at 9.30 hrs on 12 February 1987 and welcomed the participants. The Agenda is attached as Annex 1, the Group's terms of reference as Annex 2, and the List of Participants as Annex 3.

1.1 Presentation of Participants

The participants introduced themselves and indicated their main areas of relevant scientific work.

1.2 Agenda

The Agenda was adopted as proposed.

2 OVERVIEW OF CONTAMINANTS IN MARINE MAMMALS

The paper "Overview of Organochlorine Compound Analysis in Marine Mammals" by L. Reutergårdh and A. Knap was presented by Dr Reutergårdh (Annex 4). He outlined the contents and the sources of information. He indicated that the review did not cover Californian sea lions, polar bears or sea otters. The current report also cites certain publications for which the full references are not listed, due to the time constraints for preparing this report (this will be updated).

The following points were clearly identified:

- 1) A lack of reported Good Laboratory Practice (GLP) prevented a real comparison of data.
- 2) Samples had been taken of animals at different life stages, sex and fecundity--information on which was not always reported.
- 3) The number of specimens was often small.
- 4) Quantitation problems were evident, in particular, a disregard for the use of internal standards and little or no interlaboratory comparison.
- 5) Mammal blubber is a substantially different matrix from the tissues of other marine biota and additional, more detailed studies are necessary before the data analysis can be taken any further.

This overview will be revised by the authors to take account of the order of the tables (to be ranked by species) and the abbreviations used. Further comments would be welcomed.

The meeting also took note of an earlier overview paper by Drs R. Wagemann and D.C.G. Muir, "Concentrations of Heavy Metals and Organochlorines in Marine Mammals of Northern Waters: Overview and Evaluation," (Can. Tech. Rpt. Fish. and Aqu. Sci. No. 1279 (July 1984)). This overview covered papers published up to 1981 on con-

taminant levels in marine mammals from northern waters, while the report presented included the southern hemisphere as well.

3 PATHOLOGICAL CHANGES IN BALTIC SEALS IN RELATION TO CONTAMINANTS FOUND

Dr M. Olsson tabled the paper "Pathology of Baltic Grey Seal and Ringed Seal Females with Special Reference to Adrenocortical Hyperplasia: Is environmental pollution the cause of a widely distributed disease syndrome?" (A. Bergman and M. Olsson. Finnish Game Res. 44, 47-62 (1985)).

Dr Olsson presented a clear and informative overview of the pathological changes in grey seals. Several kinds of pathological changes have been found, such as kidney changes (glomerulopathy), local chronic intestinal ulcers, occlusion and stenosis of uterine lumens, benign tumours in uterus (leiomyoma), claw deformation and fractures, skin changes (alopecia) sometimes with similarities to chloracne, deformed and severe erosion of jaw bone and adrenocortical hyperplasia. The lesions occur in combination in the animals studied and at a high frequency. The findings indicate the disease complex hyperadrenocorticism.

Chlorinated historical records indicated a possible causal relationship with organic contaminants (pollutants), in particular PCBs. This temporal link was also substantiated by the spatial distribution of these effects which follows that of the present known levels of PCBs. Other causal links have been investigated, including physical stress, metal contamination, and other organochlorines.

There was a strong link between biological effects and chemical contamination with PCBs, and it was agreed that this seriously warrants further investigation. The main, most urgent requirement is for an agreed protocol for chlorobiphenyl (CB) congener analysis and agreement between member laboratories through intercomparison.

Sites requiring further interlaboratory pathological and chemical investigations of seal tissues were identified as follows: Greenland, West Scotland, Firth of Clyde, Faroe Islands, Bay of Fundy, and Gulf of St. Lawrence, Baltic Sea, and Wadden Sea.

4 TRACE METALS IN MARINE MAMMALS

Trace metals in marine mammals were considered. From the information available there was no evidence that these substances should have adverse effects on marine mammals at the concentrations found. Though high levels of cadmium have been found in kidneys of some species of marine mammals, the severe symptoms found in terrestrial mammals have not been seen.

5 REPORT FROM THE EUROPEAN SEAL GROUP

R. Dietz reported on the European seal group meeting. This group consists of scientists working with seal research. The question

of assessing population size, pathological changes and the high levels of trace metals found in seals from Greenland had been discussed at the meeting. A report from the meeting should be sent to the Marine Mammals Committee. The trace metal concentrations in seals from Greenland could be a potential threat to the Greenlanders who consume reasonable amounts of seal tissue. So far, no adverse effects had been observed.

6 PLANAR MOLECULES IN MARINE MAMMALS IN RELATION TO PATHOLOGICAL CHANGES

There was a discussion on planar molecules and their potential biological activity. New information was recently available (Tanabe *et al.* (Int. J. Environ. Anal. Chem. (in press)) from Japan in which planar molecules of similar dimension and spatial configuration to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (10 x 3 Å) could be accepted by TCDD receptors, e.g., 3,4,3',4'-tetrachlorobiphenyl. It is recommended that a further review of this subject area be made.

7 NEED FOR AN INTERCOMPARISON PROGRAMME ON DETERMINATION OF CHLOROBIPHENYLS

A need for an interlaboratory intercomparison programme for the chemical analysis of CB congeners in marine mammal tissue was clearly identified. The following programme is recommended:

- 1) The Group recommended that two sources of blubber (200 kg) each, from an area of high and low CB contamination, be identified and prepared according to an agreed protocol. This should be done in conjunction with the EEC Community Bureau of Reference (BCR) who will support their preparation to undertake stability and homogeneity trials, after which the blubber oil will be offered for certification by BCR. This programme may take 12-36 months depending on the progress of the BCR Working Group on CB Analysis. MCWG members should support this programme by offering assistance where necessary.

Participants from Denmark and Sweden agreed to deliver cost estimates for sampling such material from Greenland and the Baltic Sea, respectively. The estimates, as well as an estimate of the processing cost of the seal oils, should be sent to the Chairman not later than 27 February 1987, for further discussions with BCR.

- 2) The Group recommended that, in parallel with the activities in (1), above, ICES member laboratories involved in CB analysis using capillary chromatography, particularly of marine mammal tissue, should agree on a programme of intercalibration along the following lines:
 - a) To agree a commitment in writing from the member laboratories to a 2- to 3-year programme.
 - b) To undertake an intercalibration of standard CB solutions, using internal standards.

- c) To repeat step (b) where necessary, with discussions on methods and improvements, until the agreed level of variance is reached. Members who are also members of the BCR Group (or any other established group undertaking CB inter-comparisons) should be encouraged to assist.
- d) When agreement on the standards has been achieved, to carry out determinations of chlorobiphenyls in a certified fish oil, which should, at that time, be available from BCR.
- e) When agreement on fish oil has been achieved, to conduct determinations of chlorobiphenyls in a certified seal blubber oil, certified by that time through BCR.

The Group recommended that 1 to 3 laboratories undertake the analysis of blubber tissue from samples taken from the areas identified in Section 3, above, to provide a relatively comparable data set for the biologists studying the pathological effects. These laboratories are most likely to have a high level of quality control and may also be members of the BCR Working Group on CB Analysis.

8 OTHER ISSUES

The Group recommended that, while every progress should be made in verifying any causal link between the pathological effects and the concentrations of CBs in seals, other potential pollutants should not be ignored. In addition to planar molecules, the other compounds/groups identified were:

- Diphenyl sulphones (monomer/polymer).
- Chlorinated xanthenes.
- Chlorinated products from the wood and paper pulp industry.

The Group also recommended that closer cooperation be encouraged between biologists and analytical chemists, both at the institute and the working group level, to minimize the continuing practice of biologists undertaking analytical chemistry and chemists making biological assessments, with the inevitable misinterpretation of the others' discipline. Joint meetings, such as this, should be a regular feature of ICES activities related to pollution, and the Group recommended that it meet again in one year.

Prof. K. Palmork offered to provide a critical review on hydrocarbons in marine mammals. The Group readily accepted this kind offer.

The representative from Sweden volunteered to analyse seal blubber from seals caught in the areas identified in Section 3. Delegates concerned with this problem will be informed through ICES and urged to take advantage of this opportunity. A precise description of sampling procedure will be supplied at the same time. The aim of this study is to compare the levels of organochlorines in the blubber of seals taken from the Baltic Sea with those from the other areas.

9 RECOMMENDATIONS

The Joint Meeting recommended that

- the planar molecules accepted by the TCDD receptor should be further reviewed;
- two blubber oils should be processed in cooperation with BCR, as outlined in Section 7.1;
- an intercalibration exercise according to Section 7.2 should be conducted and a coordinator identified;
- blubber tissue from the hot spot areas mentioned in Section 3 should be analyzed;
- the causality of toxicants and pathological effects should be further investigated, as outlined in Section 8;
- a closer cooperation between biologists and chemists should be developed in a suitable forum.

10 CLOSURE OF MEETING

The Chairman thanked the participants for their contributions and cooperation in this meeting.

ANNEX 1

JOINT MEETING OF BIOLOGISTS AND CHEMISTS
CONCERNED WITH CONTAMINANTS IN MARINE MAMMALS

(Copenhagen, 12-13 February 1987)

Draft Agenda

1. Opening of meeting.
2. Appointment of rapporteur for the meeting.
3. Presentation of participants.
4. Adoption of agenda.
5. Overview of contaminants in marine mammals.
 - Presentation by Dr A. Knap.
 - Identification of different approaches in the analytical techniques for organochlorine compounds in marine mammals.
 - Discussion of the report.
6. Pathological changes in Baltic seals in relation to contaminants found.
(Presentation by Dr M. Olsson)
7. Trace metals in marine mammals.
(Presentation by Dr A. Knap)
8. Correlation between high levels of organochlorine compounds and metals.
9. Report from the European seal group.
(R. Dietz)
10. Co-planar molecules in marine mammals in relation to pathological changes.
11. Toxicants indicated to be relevant for diverse effects on marine mammals.
12. Statement of findings and recommendation of future research to understand the contaminant-induced pathology of marine mammals.
13. Any other business.
14. Closure of meeting.

ANNEX 2

C.Res.1986/2:15

- 1) A meeting of chemists and biologists concerned with contaminants in marine mammals (Chairman: Dr L. Reutergårdh) will be held at ICES Headquarters on 12-13 February 1987, with the following terms of reference:
 - a) to review critically the analytical procedures used to determine trace organic contaminants in marine mammals and the data on these contaminants currently available in the literature;
 - b) to draw up a list of reported toxicants that may have effects on marine mammals and indicate any other contaminants that might be implicated on the basis of known toxicological, structural and physical properties;
 - c) to prepare a statement of findings and identify future needs for a programme to understand the contaminant-induced pathology of marine mammals.
- 2) In preparation for the above meeting, a background paper will be prepared by Dr A. Knap and Dr L. Reutergårdh which reviews the methodology presently used to determine organochlorine residues in marine mammals and evaluates the data reported in the literature on concentrations of these contaminants in marine mammals.
- 3) In addition, the small group under the chairmanship of Dr J. Harwood, which is preparing the ICES/IOC Review of Contaminants in Marine Mammals and their Effects, will meet at ICES Headquarters on 10-11 February 1987 to finalize the Review.

ANNEX 3

LIST OF PARTICIPANTS

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