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REPORT TO W M S G (OECD)

Specific water pollutants - research in Norway

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9th October 1974

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REPORT TO WATER MANAGEMENT SECTOR GROUP (OECD)

Introduction

Research on specific water pollutants is carried out at many different institutes in Norway. The category of research going on at each particular institute is rather closely connected to the research traditions at the same institute. For example, chemical laboratories having long traditions in analytical chemistry, are mainly concerned with new analytical techniques for specific water pollutants and collection of data on such pollutants. Furthermore, laboratories working in biology have been mostly concerned with the influence on specific water pollutants on aquatic life.

The type of work going on at different institutes may be divided into different groups and sub-groups. It may be convenient to distinguish between new analytical techniques and collection of data in one main group, and the influence of specific water pollutants on different organisms and bio-techniques in another main group. Both main groups may have sub-categories such as heavy metals and persistent organic chemicals.

Short presentation of research actually going on

Table 1 gives names and addresses of institutes where the most important activities are in progress. This table also indicates, by numbers corresponding to numbers in the list of references, the groups and sub-groups in which the respective institutes have their main activity. Although Table 1 only illustrates published results, this table also indicates the kind of research programmes actually going on. Further details about the research programmes are available from the separate institutes.

Although co-operation between different institutes is taking place, most projects are in the main carried out at one or two institutes. One particular project, acid precipitation effects on forest and fish (The SNSF-project) is a typical inter-institutional project. In this national project, which is associated with the OECD project on long range transport

of air pollutants, many different institutes are working in close co-operation. An important part of this project is monitoring of both heavy metals and persistent inorganic chemicals transported from abroad to Norwegian inland water resources. A description of this project is given in Appendix.

SAM/WIN

APPENDIX

INFORMATION ABOUT THE SNSF-PROJECT

The joint research project, "Acid Precipitation – Effects on Forest and Fish" (the SNSF-project) of the Agricultural Research Council of Norway (ARCN) – Royal Norwegian Council for Scientific and Industrial Research (NCSIR), Was started in 1972. The objective of the project is to;

1. – establish as precisely as possible the effects of acid precipitation on forest and fresh water fish.
2. – investigate the effects of air pollutants on soil, vegetation, and water, required to satisfy point 1.

A Steering Committee with one representative from each of the two Research Councils and one from The Ministry of the Environment has overall direction of the project. The *Project leader* has the main responsibility for conducting the research activities on the entire project. The *Project Committee* consists of the project leader and one *Contact person* from each of the four main institutes cooperating within the project. The Steering Committee is responsible for research policies and financial questions. The Project Committee deals with research administration on a practical level, with secretariat at the Norwegian Forest Research Institute, Aas.

Research activities on the project are organized and carried out inter-institutionally with main programs in the following institutes:

Norwegian Water and Electricity Board (NVE)
Norwegian Institute for Air Research (NILU)
Norwegian Institute for Water Research (NIVA)
Norwegian Forest Research Institute (NISK), and
institutes of the Agricultural University of Norway (NLH) which form the group of "Aas-Institutes".

In addition, there are secondary programs in the Central Institute for Industrial Research (SI), the University of Oslo (UiO), and the University of Bergen (UiB), and close contact with the Directorate of Fish and Game (Trondheim-Aas).

The research project is for the time being supported financially by the two Research Councils, the Ministry of the Environment, and participating institutes.

Project research results are published in *Technical notes, Internal reports, Research reports* and/or in international journals.

Inquiries about ARCN-NCSIR's joint research project: "Acid Pricipitation – Effects on Forest and Fish" can be directed to:

SNSF-project, NISK, 1432 Aas-NLH, Norway.

LIST OF REFERENCES

Numbers correspond to numbers in Table 1

Central Institute for Industrial Research

1	G. Lunde	Analyse av tungmetaller og organiske forurensninger i vann og biologiske materialer. VANN - 2 - 1973, 8. årg., pp. 146 - 149.
2	G. Lunde	The Analysis and Characterization of Trace Elements, in particular Bromine, Selenium and Arsenic in Marine Organisms. Blindern, January 1974.
3	G. Lunde	Analysis of exchange samples (COST-64b). (The work is performed under contract B 1550-3610 with Royal Norwegian Council for Scientific and Industrial Research). Blindern, 16th May 1974 (GL/JG/gs).
4	J. Geter	Teknisk rapport nr. 1. Arbeidsmøte COST 64b 6.-8.3.1973. Oslo, 3th April 1973.
5	G. Lunde og E. Steines x)	Halogens and Sulphur in Marine Oils. Oslo, 16th October 1973.
6	G. Lunde	Appendix. Outline on the measurement of total chlorine, bromine and iodine in non-polar organic bound form in water. Oslo, 30th August 1973.
7	G. Lunde	Oppdrag nr. 452 - 72 02 05 B 1520.3610. Analyse av marine mikroforurensninger. Teknisk rapport nr. 1: Dyrking av alger med PCB tilsatt næringsløsningen. NTNF, Oslo, 14th February 1973.
8	G. Lunde og J. Gether	Oppdrag nr. 452 - 72 02 05 B 1520.3610. Analyse av organiske mikroforurensninger. Teknisk rapport nr. 2: Bestemmelse av PCB i vann. NTNF, Oslo, 3rd January 1974.

x) Institute for Atomic Energy

Central Institute for Industrial Research (cont.)

9	G. Lunde	Oppdrag nr. 452 - 72 02 05 B 1520.3610. Analyse av organiske mikroforurensninger. Teknisk rapport nr. 3: Upolare klorerte hydrokarboner i marine olje NTNF, Oslo, 24th January 1974.
10	G. Lunde	Oppdrag nr. 452 - 72 02 05 B 1520.3610. Analyse av organiske mikroforurensninger. Teknisk rapport nr. 4: Analyse av flyktige og ikke flyktige halogenerte upolare hydrokarboner i marine organismer. NTNF, Oslo, 31st May 1974.
11	G. Lunde	Oppdrag nr. 452 - 72 02 05 B 1520.3610. Analyse av organiske mikroforurensninger. Teknisk rapport nr. 5: Analyse av utvekslingsprøver fra COST 64b-prosjektet. NTNF, Oslo, 4th June 1974.
12	G. Lunde	Oppdrag nr. 452 - 72 02 05 B 1520.3610. Analyse av organiske mikroforurensninger. Teknisk rapport nr. 6. Ekstraksjonsutstyr for "ON SIZE" isolasjon av upolare organiske mikroforurensninger i vann. NTNF, Oslo, 27th July 1974.

Department of Marine Biology and Limnology
Section Marine Botany

13	A. Thorvin Andersen	Tungmetaller og andre forurensninger i Oslofjorden og kystfarvann - innvirkning av disse på marine organismer. VANN - 2 - 1973, pp. 84 - 88.

Directorate for Wildlife and Inland Fisheries

14	E. Snekvik	Forurensninger fra svovelkisgruber - forsurning av vassdrag i våre sydligste landsdeler - kalking av sure fiskevann - pressaft fra silo. VANN - 2 - 1973, 8. årg,. pp. 106 - 109.

Institute of Marine Biochemistry

15	A. Jensen and B. Rystad	Heavy Metal Tolerance of Marine Phytoplankton. I. The Tolerance of three Algal Species to Zink in Coastal Sea Water. J.exp.mar.Biol.Ecol., 1974, Vol. 15.
16	A. Haug	Akkumulering av tungmetaller i marine alger. Symposium om tungmetallforurensninger, Hurdalssjøen, 14.-16. February 1972, s. 198 - 206.

Institute of Marine Biochemistry (cont.)

17	A. Jensen	The usefulness of trace elements analysis of seaweeds for determining the distribution of heavy metals in fjord areas. Abstract. In press in "Environmental Pollution", 1974.
18	A. Jensen	Kinetic studies of the uptake of ^{63}Ni by cultures of the diatom Phaeodactylum tricornutum Bohlin. Abstract. In press in "Physiologia Plantarum", 1974.
19	A. Jensen	Planktonalger i dialysekultur for karakterisering av vekstkapasitet/vannkvalitet. Fastsittende marine alger som indikatorer på tungmetallforurensning i fjorder og kystfarvann. VANN - 2 - 1973, 8. årg., pp. 117 - 121.

Institute of Marine Research

20	K.H. Palmork og S. Wilhelmsen	Fisken og Havet. Polycycliske aromatiske hydrokarboner i det marine miljø. En forurensning fra aluminium-industriens smelteverk. Serie nr. B, nr. 3, 1972.
21	K.H. Palmork og A. Vinsjansen	Fisken og Havet Oljedispergeringsmidler og vannløselige oljekomponenter. En gasskromatografisk - massespektrometrisk undersøkelse. Serie nr. B, nr. 4, September 1972.
22	K.H. Palmork og S. Wilhelmsen	Fisken og Havet. Avfallstoffer fra vinylkloridproduksjonen. Identifisering ved hjelp av preparativ gasskromatograf og kombinasjonen gasskromatograf massespektrometer. Serie B, nr. 5, November 1972.
23	K.H. Palmork, S. Wilhelmsen, A. Vinsjansen og T. Neppelberg.	Fisken og Havet. Kjemiske komponenter i tønner (fat) med industriavfall funnet i norske kystfarvann. Serie B, nr. 7, June 1973.
24	K.H. Palmork og S. Wilhelmsen	Fisken og Havet. Undersøkelse av fisk fra oljeforurenset område av Gisundet. Serie B, nr. 4, February 1974.
25	K.H. Palmork, S. Wilhelmsen and T. Neppelberg	Report on the Contribution of Polycyclic Hydrocarbons (PAH) to the marine Environment from different Industries. C.M. 1973/E: 33 . ICES
26	K.H. Palmork	Enkelte trekk fra undersøkelser vedrørende marin forurensning i tidsrommet 1970 - 1973. 25th February 1974. (Private Communication)

Institute of Marine Research (cont.)

27	K.H. Palmork	Forurensningsproblemene i Nordsjøen og grensende havområder. IVL-konferensen, Stockholm, May 1972, pp. 151-173.
28	K.H. Palmork	Polysykliske aromatiske hydrokarboner i det marine miljø. Nionde Nordiska Symposiet om Vattenforskning. Fjorder og kystvann som resipienter. Troudheim, 27th to 29th June 1973. Miljövårdssekretariatet, publ. 1974:4. Pp. 99-125.

Institute for Atomic Energy

29	B. Salbu	Bestemmelse av sporelementer i ferskvann ved instrumentell neutronaktiveringsanalyse og elektronisk databehandling av måleresultatene. Thesis, 1974, Main Subject at The University of Oslo. (Chemical Institute, Dept. of Nuclear Chemistry).

National Institute of Public Health

30		Rapport vedrørende utløsning av kjemiske elementer - særlig bly og kadmium - i ledningsvann. Oslo, 29th August 1972.
31	J.A. Myhrstad	Kvikksølv i norske vannforekomster og drikkevann. Symposium om tungmetallforurensninger, Hurdalssjøen, 14.-16. Februæry 1972, pp. 119-128.
32	I. Dahl	Bly i norske vannforekomster og drikkevann. Symposium om tungmetallforurensninger, Hurdalssjøen, 14.-16. February 1972, pp. 161-168.

Norwegian Institute for Water Research

33	K. Balmér	Bestemmelse av kobber og sink ved lave konsentrasjoner i naturlig vann. NIVA-rapport QK-3/73, March 1974.
34	S.T. Källqvist	Bioassay for bestemmelse av plantevernmiddelresters innflytelse på alger. Symposium om miljøvirkninger av pesticider og enkelte beslektede stoffer, pp. 92 - 95. Lifjell Turisthotell, 25th to 27th October 1973.
35	M. Grande	Tungmetallenes innvirkning på ferskvannsfisket. Symposium om tungmetallforurensninger. Hurdalssjøen, 14th to 16th February 1972, pp. 207 - 212.

The Agricultural College of Norway

36	E. Vigerust	Heavy metals and persistent organic chemicals in sewage sludge. (Unpubl.)

The Veterinary College of Norway
Institute of Food Hygiene

37	B. Underdal	Tungmetall i akvatiske og marine miljø. VANN - 2 - 1973, 8. årg., pp. 99 - 100.

The Veterinary College of Norway
Institute for Pharmacology

38	N.J. Kveseth	Persistente organiske klorforbindelser i akvatiske og marine miljøer. VANN-2-1973, 8. årg., pp. 101-105.

The SNSF-project

39	A. Henriksen[1)] T. Dale[1)] S. Haugen[1)]	Smelting av forurenset snø i termostatert lysimeter. Intern rapport, IR 1/74, February 1974.
40	G. Lunde[2)]	Analyse av organiske mikroforurensninger i sur nedbør. Intern rapport, IR 2/74, April 1974, pp. 15-24.
41	T. Dale[1)] A. Henriksen[1)] Y. Gjessing[3)]	Regionale snøundersøkelser vinteren 1972 - 1973. Intern rapport IR 2/74, April 1974, pp. 38-62.
42	T. Dale[1)] A. Henriksen[1)] E. Joranger[4)] S. Krog[5)]	Vann- og nedbørkjemiske studier i Birkenesfeltet for perioden 20. juli 1972 til 30. april 1973. Teknisk notat, TN 1/74, April 1974.
43	H. Dovland[4)] T. Dale[1)] E. Joranger[4)]	Undersøkelse av elvevannets kjemiske sammensetning under snøsmelting. Teknisk notat, TN 2/74, April 1974.

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1) Norwegian Institute for Water Research

2) Central institute for Industrial Research

3) The University of Bergen.

4) The Norwegian Institute for Air Research

5) Norwegian Water Resources and Electricity Board

TABLE 1. SPECIFIC WATER POLLUTANTS. REFERENCES TO RESEARCH IN NORWAY

Numbers correspond to numbers in the list of references

No	Research field / Institutions, projects in Norway	Monitoring and registrations of inorganic and chemical pollutants - analytic methods			Influences of specific chemical pollutants in different organisms - bioassay - techniques etc.		
		Heavy metals, metalloids etc.	Persistent organic chemicals PCB, PAH etc.	Miscellenous	Heavy metals, metalloids etc.	Persistent inorganic chemicals PCB, PAH etc.	Miscellenous
1	Central Institute for Industrial Research. Forskningsveien 1, Blindern, Oslo 3	1, 2, 5, 6	1, 3, 4, 7, 8, 9, 10, 11, 12			7	
2	Department of Marine Biology and Limnology. Section Marine Botany. University of Oslo, Blindern, Oslo 3	13					
3	Directorate for Wildlife and Inland Fisheries. 1432 Ås - NLH	14					
4	Institute of Marine Biochemistry. The Technical University of Norway, 7034 Trondheim - NTH				15, 16, 17, 18		
5	Institute of Marine Research. Nordnesparken 2, 5000 Bergen		20, 21, 22, 23, 25, 28	26, 27			24
6	Institute for Atomic Energy 2007 Kjeller	29					
7	National Institute of Public Health Geitmyrsveien 75, Oslo 4.	30, 31, 32					
8	Norwegian Institute for Water Research P.O. Box 333, Blindern, Oslo 3	33			35	34	
9	The Agricultural College of Norway. 1432 Ås - NLH	36	36				
10	The Veterinary College of Norway. Ullevålsveien 72, Oslo 4.	37	38				
11	The SNSF-project. Norwegian Forest Research Institute. 1432 Ås - NLH		40	39, 41, 42, 43			