Workshop on

Monitoring the Environmental Fate of Chemicals

Stora Brännbo, Sigtuna, 6-8 June 2001

Organized by three working groups under the

Nordic Council of Ministers:

The Nordic Chemicals Group,
The Nordic Working Group on Monitoring and Data and
The Nordic Working Group on Air and Sea Pollution

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R E P O R T

Introduction

The initiative for this workshop was based on the notation that our knowledge on the state of the environment with regard to chemicals in use is very limited. Many existing monitoring programs also focus on a few chemicals which are already banned or severely restricted. In most countries, very little is known even on the High Production Volume Chemicals (practically none of the thousand most used chemicals is included in the national monitoring programmes). We can also see increasing demands for data of this kind in different fora (e.g. the EU Water Framework Directive, the EU Programme on Existing Substances, OSPARCOM, HELCOM, etc.).

The workshop aimed at examining the state of art for monitoring of chemicals in the Nordic countries and at identifying areas of common interest. As a result of the discussions a proposal was made for a joint project where coordination and joint efforts are supposed to be beneficial to the Nordic countries.

The workshop focussed on industrial chemicals and chemicals in consumer products that are on the market today. However, agricultural pesticides and products formed in combustion processes were not discussed.

The about 35 participants represented mainly environmental regulators/policy makers involved in monitoring and/or chemicals control. Some participants were personally invited, but the workshop was open also to other interested persons.

The program was divided into three main sessions: 1) Background, regulatory needs and international outlooks. 2) Selection of substances and structuring screening programs - sources of information and practical experiences. 3) Benefits and drawbacks from cooperation. In a final session summary and conclusions including proposals for follow up actions were formulated.

The workshop was sponsored jointly by three working groups under the Nordic Council of Ministers: The Chemicals Group, The Group on Monitoring and Data and The Group on Sea and Air

The organizing committee was chaired by *Alf Lundgren,* from the National Chemicals Inspectorate in Sweden. Other members were *Alec Estlander* from the Finnish Environment Institute, *Ola Glesne* from the Norwegian Pollution Control Authority, *Gun Lövblad* from the Swedish consultant IVL and *Britta Hedlund,* from the Swedish Environmental Protection Agency. *Ingunn Selvik* from the Norwegian Pollution Control Authority was secretary until the end of 2000. After that *Magnus Nyström*, from the Finnish Environment Institute was secretary and editor of the report.

Wednesday 6 June 2001

Plenary session 1:

An international outlook: Current information needs from the chemicals control

Esa Nikunen from the Finnish Environment Institute chaired the session. Rapporteur for the session was *Britta Hedlund,* from the Swedish Environmental Protection Agency.

Background for session 1:

In spite of extensive monitoring in the Nordic countries, very little is known on the state of the environment regarding chemicals in use. Still, there are increasing demands for such data. The regulatory needs are addressed in this section and comprise data for risk assessment, priorities for risk reduction, follow up of risk reduction measures, etc. Other questions to be addressed in the presentations and discussions are:

- How can we increase the availability of such data?
- How should monitoring programmes be designed to satisfy these needs and still be economically justified?
- What experiences and trends in this field can we see in other countries, in EU and elsewhere?

The first theme to be discussed was to identify the needs.

Esa Nikunen from the Finnish Environment Institute gave the first presentation on the subject "Information needs based on the state of the environment; A regulator's perspective."

There are more than 30.000 substances on the EU market, but we cannot evaluate all of them. The priority setting should be based on the effects and exposure. We need data on fate also in risk assessment. Most present data concerns banned or severely restricted substances.

Screening information is often sufficient. However, more substances need to be included in monitoring programmes. The most important issues to get information on are

- time trends (specimen banking and sediment analysis are important)
- measurements in the urban or other polluted environments.

See appendix 1

Alf Lundgren from the National Chemicals Inspectorate in Sweden gave a presentation

on the subject "Are there specific requirements for screening and monitoring of chemicals in use?"

He presented the question: what is the purpose of monitoring? and referred to the following answer: "Surveillance to ensure that previously established quality conditions have been met". In this connection surveillance should be understood as "A systematic and orderly gathering of data through time" (Hallowell, 1978)

There are several approaches to monitoring. Two of them are:
- Comparison with time trends and "background levels"
- Risk based approach (PEC/PNEC) (ex. plant protection products, biocides)

Screening is the first step before a real monitoring. The results of the screening phase may be:
- no immediate action required
- more data is needed
- more actions are needed

See appendix 2

Jens Brøgger Jenssen from the Danish Environmental Protection Agency told about "The Danish environmental authorities' considerations leading to NOVA 2003."

The general principle for NOVA 2003 is to assess the quality status and impact on the environment. According to the goals of the programme it should document the achievements of quality objectives and the effectiveness of measures.

The principle is to collect data systematically and to be systematic in handling and assessment over time of a given set of information.

The substances considered for inclusion in the programme are
- part of EU-directives
- considered in OSPAR and HELCOM joint monitoring programmes
- in the North Sea Conference
- in the Danish EPA chemical strategy.

See appendix 3

Theme 2: "State of the Art"

Roland Kallenborn from the Polar Environmental Centre, Norway and *Per Erik Iversen* from the Norwegian Pollution Control Authority presented the international monitoring activities under AMAP, EMEP, CAMP.

The state of the art for international contaminant monitoring was presented and evaluated. Gaps, needs and limitations were also presented. The speakers referred also to some web-addresses: http://www.ospar.org, http://www.helcom.fi and http://www.amap.no

Table1: Minimum information to justify use of existing ambient monitoring data (from OECD series on testing and assessment number 18 (2000))

Criteria	**Ideal set**	**Minimum set for exposure assessment**
Objective of the programme	x	
What has been analysed?	x	x
Analytical method	x	x
Unit	x	x
Limits of quantification	x	x
Blank concentration	x	
Recovery	x	
Accuracy	x	
Reproducibility	x	
Sampling protocol	x	
One shot mean		
Location	x	
Date	x	minimum knowledge of the year
Time	x	
Matrix characteristics	x	
Proximity and influence of sources	x	x
Discharge emission pattern and volume	x	
Flow and dilution or application rates of water body sampled	x	x
Explanation of value assigned to non-detects if used in a mean	x	x
Description of statistical evaluation of results	x	Minimum required is whether one-shot or mean

See appendix 4

Theme 3: "Visions of an International Cooperation"

Bo Jansson from the University of Stockholm, ITM ended the first plenary session with his presentation called: "Visions of international cooperation."

He emphasized that information about ongoing activities is vital. A basic requirement for a well functioning monitoring programme is a good communication between data producers and data users, and also among different data users and data producers. Different kinds of networks on different levels are discussed for example within UNEP.

When planning a screening project one must not neglect the comparatively small number of institutions that have resources to carry out the work. There is a lack of persons and resources on all levels - in the labs and also in the agencies.
See appendix 5

Group discussions

Questions for group discussions on information needs

1: What data is needed for
   a) risk assessments (RA) and
   b) risk reduction strategies (RRS)?
2: What data is needed for following up RRS?
3: How would it be possible to increase data availability?
4: Experiences gained form other countries.

The first day ended with discussions in three groups. All groups got the same four questions to discuss. *Esa Nikunen, Britta Hedlund* and *Alf Lundgren* chaired the groups. Rapporteurs were *Roland Kallenborn, Per Erik Iversen* and *Maria Dam*. Finally the groups reported the results of their discussion in plenary. From this reporting session the following notations could be extracted:

Question 1: What data is needed to prepare risk assessments (RA) and risk reduction strategies (RRS) ?

We need several types of data for RA/RRS. Ranking between them is not possible. All of the following items can be a starting point:
- source identification
- the properties of the substance
- identify possible pathways of transport and exposure
- level of exposure
- concentrations in different media
- ecosystem effects, community studies, biomarkers.

Other types of data that might be of interest:
- basic information on production, emission, fate, distribution, toxicity
- exposure data especially human exposure data important for monitoring
- screening data on other ' new' compounds (persistent)
- continuing monitoring of conventional compounds to follow up national/-international reduction measures
- measuring data important for RRS
- inclusion of modelling data in RA/RRS evaluations.

Question 2: What data is needed for following up RRS?

What is needed depends on the properties of the substance
Most likely data needed:
- levels of exposure
- concentrations in different media
- ecosystem effects
- long-term measurements of contaminants
- indicator compounds for conventional compounds
- socioeconomic data needed both for emission and target site.

Question 3: How to increase data availability?

- Authorities should request that primary data should be made publicly available
- cooperation with private laboratories and industry
- Nordic initiatives should lead to increase of data transparency. Standard format for data reporting should be developed, including QA/QC and method description
- encourage the establishment of a metadatabase which contains info on what has been done on environmental monitoring including complementary info that may be used for QA/QC.
- Data produced by public money should be publicly available.

We need better access to information from:
- international monitoring programmes
- national monitoring programmes
- community monitoring programmes
- research programmes
- research institutions
- the industry
- "grey literature".

What to do?
- knowledge of databases and QA-activities
- establish topic centres for chemicals (EEA/ECB)
- aggregate data to "datahosts" - "data warehouses".

However, data ought to stay as close to the data producer as possible

Question 4: Experiences gained form other countries

- USA/UK: "real time" data presentation on the Internet
- need for more cooperation with the Nordic countries (e.g. We should study and learn from NOVA 2003)
- use experiences from other European countries, QUASIMEME and modelling activities (e.g. UK/NL, "World record" in monitoring of contaminants)
- use experiences from USA and Canada, e.g. EPA and FDA
- use experiences from ICES and ACME
- we can learn from the Japanese example on screening.

Thursday 7 June 2001

Plenary session 2:

Which substances should be selected?
How should we monitor them?
Sources of information. Development of screening programmes.

Sigurbjörg Gisladottir from the Environmental and Food Agency of Iceland chaired the second plenary session. Rapporteur for this session was *Gun Lövblad* from the consultant company IVL in Sweden

Background for session 2:

There are approximately 15-20 000 major chemical substances on the European market. There is a yearly increase in the production. On a global scale more than 400 million tonnes of chemicals are produced each year. We have lack of knowledge about the properties of the substances, where they are used and to what extent they are found in the environment.

We cannot monitor all substances. We need to set priorities and start by making an inventory of the substances with the highest priority. There are several ways to rank substances for screening. Some are discussed in this session. There are also different approaches how to set up a screening programme. Some examples on how screening is carried out in the Nordic countries are also given.

The first presentation was called "NSDB A Nordic database for priority setting of hazardous chemicals" and the speaker was *Bert-Ove Lund* from the National Chemicals Inspectorate in Sweden

The Nordic Substance Database was elaborated within a joint Nordic project. The database is large and contains information from laboratory tests - for bioaccumulation also measured and modelled data - for many substances. It can be bought on a CD from the secretariate at NMR Copenhagen. The project group will release a new CD version later this year. Interested persons can also achieve further information from the country representatives of the Nordic Chemicals Group (See addresses at Internet site: http://www.norden.org/miljoe/sk/kemikalie_adresser.asp?lang=1). The database can also be used for selecting substances for monitoring. The database is not final, but will be updated with additional groups of substances.
See appendix 6

Susanne Boutrup from the Environmental Monitoring Coordination Section, National Environmental Research Institute gave a presentation called: "NOVA-2003 - Principles for Implementing new substances in the Danish Water Monitoring Programme"

In the selection of parameters to be analysed in a monitoring programme we must make several considerations, including studies of occurrence, effect on the environment, national use, metabolites and cooccurring substances, legislative levels, relevant matrices, sampling strategies, analytical methods etc. The present Danish Water Monitoring Programme will run until 2003 and will then be revised. In connection with this, there will be a need for including several new substances. The NOVA 20030 will be used in prioritizing for the new programme. Further information can be found on ovs.dmu.dk.
See appendix 7

Harald Sørby from the Norwegian Pollution Control Authority talked about the subject: "Industrial reporting of releases of chemicals in Europe (European Pollutant Emission Register, EPER); experiences from the Norwegian PRTR)"

To keep a pollution emission register is a key element in all risk abatement activities and also in the European Directive on Integrated Pollution Prevention Control (IPPC). The European Register will provide information to the public on emission from many industrial facilities. A guidance document on IPPC-directive can be found on the Commission web page.

The Norwegian system is called INKOSYS (Industri Kontroll System) and contains reporting of all regulated chemicals, regulated production volumes and generated waste. A Norwegian guidance document is available from SFT web site, www.sft.no\bmi where also publicly accessible information from INKOSYS is available.
See appendix 8

Poul Erik Andersen from the Danish governmental authorities on occupational health presented the Nordic cooperation to build a new database. The presentation was called "SPIN (Substances in Products in the Nordic countries) Increasing the availability of data from the Nordic Product Register."

The need for data on chemicals on a Nordic level is met with the establishment of a central Nordic register. The Nordic Product Register Group working under the Nordic Chemicals Group, will build a SPIN database with the task of storing data on the use of chemical substances. The database will be based on aggregated data from product registers in the Nordic countries. It will be mainly distributed to relevant authorities in the Nordic countries. In the future the SPIN data base may be accessible via the web. A pilot verions is produced in 2001 and a first complete version will be available in 2002.
See appendix 9

Eva Brorström-Lundén from IVL in Sweden talked on the subject: "The HCBD case: On how to design a screening programme"

A screening study was made in Sweden for the occurrence of hexabromo-cyclododecande (HBCDD). A sampling strategy included the identification of possible sources, levels in different media in rural, urban, and industrial environ-

ments. The accumulation of HBCDD in the ecosystems was studied in soil, sediments and fish and human exposure via air and food. No estimate and no risk assessment have yet been made from the Swedish results. What we can learn from the results, is that to increase the results of the screening measurements, they should be carried out in parallel with other monitoring and measurement campaigns. Also the seasonal variation is of interest and the next step in Sweden, will include chamber studies to find out the importance of evaporation and re-emission. No separation of gas and particle phases was made in the Swedish study, but will be included in the next stage. As a minimum number of samples desirable for screening a magnitude of 200 would be useful. However, budget restrictions often reduce the activities.
See appendix 10

"A joint Nordic screening programme" was presented by *Ola Glesne* from the Norwegian Pollution Control Authority.

The Nordic countries have planned a joint Nordic effort to screen the occurrence of hazardous substances in the environment. The screening results will be the basis for future decisions on needs for abatement and monitoring, and will further give important information to the EU chemicals work. Further planning will be made in the working groups. The discussion of the activity stated that success is necessary for a coming project. As in the case of HBCDD, the screening will not be one of the first stages of the process but may be relevant later. Many countries may already have set up restrictions when the results are there. This has to be considered in the selection of substances. The coming EU meeting must also be considered in the planning of the project.
See appendix 11

"The Swedish screening programme" was then presented by *Britta Hedlund* from the Swedish Environmental Protection Authority.

The screening is a part of the national monitoring programme in Sweden. The program covers many substances, such as chlorinated solvents, chlorinated paraffins, metals, pesticides, HBCDD, TBBPA, chlorophenols. organic tin-compounds, octylphenols, phosphorylated flame retardents, highly phosphorylated compounds and triclosan.
See appendix 12

"Screening projects in Finland" were presented by *Johanna Peltola* from the Finnish Environment Institute, Chemicals division.

Two screening projects are underway in Finland. The first deals with pesticides in ground water used as drinking water in the City of Lahti. It prioritises substances important for the Water Framework Directive (WFD). Also the second project is aiming at finding information important for the WFD. This project is presently being planned and will include the collection of data on other environmental matrices and releases. The criteria for selecting parameters in the screening are based on persistence, bioaccumulation and toxicity (PBT):

P: readytest > 70% $DT_{50} \geq 5$
B: BCF $\geq$ 500, $\log_{kow} \geq 4$
T: $EC_{50} \leq 10$ mg/l, NOEL $\leq$ 1 mg/l

It is not possible to measure all substances at all water bodies where important substances are released. For pesticides for example there are areas with intensive use and with a more sparse use; The worst and the average cases will be chosen.

In addition, brominated flame retardants (BFR) were screened last year to get a rough picture of the levels of occurrence of BFRs, identification of the most interesting compounds and their sources and also to find a suitable sampling strategy.
See appendix 13

Group discussions

Questions for the group discussions
on development of programmes for collection of information

1. Screening and monitoring *(Discussed in all groups)*
   - Which substances should be selected?
   - How should we monitor them?
   - Indicator substances?
   - Simplified methods?
2. Use of models in monitoring *(Groups II and III)*
   - Which types of models are useful?
   - What monitoring data are needed as input data and for validation?
   - Other requirements?
3. Proposals for activities on a Nordic level? *(All groups)*
4. Sources of information and how they can be improved? *(Groups I and II)*
5. Databases - how to maintain the databases? *(Group III)*

Also the second day ended with discussions in three groups. This time the groups were instructed to discuss either several topics from the list in the box above or to focus on just one or a few of them. For example topics 1 and 3 were therefore discussed by all three groups while topic 5 was discussed only in one group.

During the reporting in plenary from these discussion the following notations were made.

Group I
Chairman: *Bert-Ove Lund*
Rapporteur: *Alec Estlander*

The group chose to focus on the topics 1, 3 and 4.

Topic 1. Screening and monitoring

- Which substances should be selected?
  - Substances of high priority and previously not studied/ unknown, e.g. PFFOS
  - OSPAR-list. Examples from this list are brominated flame retardants, chlorinated paraffins and musks.
  - Much work has to be done: So, get going!
- How and where should we sample?
  - Start with sewage sludge
  - Long term effects can be studied in sediments
  - Human samples: milk, urine, serum can be used to get comparable results form all countries.
  - The Nordic countries should share the work

- Focus for nordic projects should be Nordic shield/Atlantic
- Use the existing sampling infrastructure (e.g. EMEP)

The group presented the different stages and the participants in these activities in the following table:

Detection	Screening	Monitoring
At the most likely spots; one country responsible	At least two countries; one lab	All countries

Topic 3. Nordic screening activity proposals

Any proposed activity should have a broad coverage of the Nordic area. It should consider long range transport from Europe, Russia and North America. Nordic representativeness is in this connection approximately the same as national representativeness. Approximately 30 - 200 samples in the Nordic countries are sufficient, but the number must depend on the sources. There is a need to cover all countries for representative and political reasons.

Topic 4. Information sources and how they can be improved.

- Monitoring data should be available.
- We need a special inventory of databases; "Meta databases."
- Nordic web sites are important and horizontal reporting is essential.
- There must be a free flow of information between universities and monitoring programmes.

Group II
Chairperson: *Eva Brorström-Lundén,*
Rapporteur: *Sigurbjörg Gisladottir*

The group decided to discuss topics 1-4 (see list of questions above).

Topic 1. Screening and monitoring

- Which substances should be selected?
  - The group did not select a certain substance
  - discussion focussed on criteria for selection
  - High Production Volume chemicals (HPV) in industry and in products
  - substances not yet given priority
  - substance used in Nordic countries
  - exposure through different routes, food, products, natural environment and working environment
  - substances that are easily getting into the aquatic environment - water soluble substances
  - OSPAR list of substances of possible concerns (LOPC)PBT
  - Water framework directive and the proposed ranking procedure COMMPS
  - national priority lists

- probably not substances that have been screened in some Nordic Countries
- substances which can be studied with good analytical methods
- dividing the substances between the countries.

- How should we monitor them?
  - Select media that we can compare
  - the selection of a matrix depends on the substance
  - joint monitoring done at the same "date" period - temperature, other factors
  - manual for the sampling
  - analysis in one laboratory or inter calibrations!
  - dividing the substances between the countries.

- Indicator substances
  - The indicator approach is difficult.
  - The work should start with screening.
  - One compound should be chosen for a given set of properties.
  - Indicator substances can be used for finding priority substances.

- Simplify methods
  - Select certain media.
  - We could possibly simplify other involved parameters but preferably not during the first screening phase of monitoring programs.

Topic 2. Use of models in monitoring

The group stated that we have to use models to some extent.

- Which types of models are useful?
  - Models will give indications.
  - Properties from and for QSAR.
  - Models can be used to study transport processes, fate and pathways.
  - Models are useful for studying, comparing and preparing for different scenarios.
  - Models have to be used with scientific realistic consideration.
  - Models are complimentary with data for validation.

- What monitoring data are needed as input data and for validation
  - It depends on the model.
  - Some measurements are always needed to verify what you are trying to show.

- Other requirements
  - To choose the appropriate media for the screening and
  - to choose the appropriate models that can be of help.

Topic 3. Proposals for activities on a Nordic level

- Screening is a good starting point for cooperation.
- Nordic databases (e.g. NSDB and SPIN) are useful tools.

- Data reporting formats should be harmonized.
- How to select samples (AMAP)?
- Surveys of "food baskets" common to the Nordic countries for the measurement of exposure of certain substances.

Topic 4. Sources of information and how they can be improved.

- Harmonised reporting - mapping - calculations of concentrations - measurements - values - manuals for monitoring - databases
- The group emphasised the "Success story" criteria!

Group III
Chairperson: *Gun Lövblad*
Rapporeur: *Bo Jansson*

The group discussed all topics on the list except topic 4.

Topic 1. Screening and monitoring

- Which substances should be selected?
  - Water framework directive (WFD), EU hazardous substances (76/464), and other media, environmental quality objectives should be taken into account.
  - not restricted compounds
  - alkylphenols? triclosan?, "new" groups, e.g. from cosmetics and pharmaceuticals, indicator compounds
  - method -development
  - terrestrial species
  - publicity to raise funds
  - we can put aside many substances from screening,
  - start with a worst case study
  - human samples are possible but we need to be able to explain the results

Topic 2. Use of models in monitoring

- EUSES is useful to predict the distributionbut there are always reasons to be careful with the predictions.
- Models have to be combined with measurements and results from different models and measurements should be compared.
- Emission factors can be derived from international emission registers (e.g. UNEPs Pollutant release and transfer registers PRTR) and emission scenarios in the technical guidance documents (TGD) for risk management and in some OECD documents

Topic 3. Proposals for activities on a Nordic level?

- A Nordic cooperation needs to be a success.
- This workshop is an example of how to share knowledge.
- A Nordic project could predict distribution of chemicals to decide where to

measure and how to use emission factors in combination with Nordic product registers.

- Another proposal for a Nordic project could be a planning period possibly financed by the NMR before the start of a Nordic monitoring programme. More than one substance should be selected and available information collected. One small set of substances would be screened using samples taken in the participating countries would be analysed in one lab.

Topic 5. Databases - how to maintain the databases?

- Different coverage in the Nordic product registers but they are being developed. The authorities are creating a register on chemicals in cosmetics in Sweden
- "All measured data should be available" and research results should be more accessible. Even some governmental labs are sometimes not reporting. Although it is and will always be impossible to retrieve all existing information,
- All databases have to be maintained. NMR and others are often willing to create bases but not to maintain them, due to long term costs and technical problems with long term data storage.
- Nordic projects: Approach EEA to find out if they are interested to discuss development and maintenance of databases for chemicals.
- Web-sites to find information on chemicals (databases and models) are: www.oecd.org/env/, ecb.ei.jrc.it and www.kemi.se

Friday 8 June 2001

Plenary session 3 :

Why Nordic co-operation?
In what areas?
Views and experiences from regulators and the monitoring community.

During the final day of the seminar *Ola Glesne* from the Norwegian Pollution Control Authority chaired the third plenary session of the seminar. *Magnus Nyström* from the Finnish Environment Institute was rapporteur.

Background for session 3:

There is very little Nordic cooperation between the national authorities in hazardous substances monitoring today. Improved cooperation may supply data of broader relevance, better representability and probably better quality. It may also help the countries to use their monitoring resources in a more effective way by sharing costs and data. To achieve this, the challenge is to decide how to cooperate in sampling, analysis, quality assurance and reporting. How can we ensure comparable data and good overall quality? What can be done separately by each country? What should be done for all countries by one part? Which problems are particularly important to solve to succeed?

The secretaries of two Nordic working groups presented some "reflections from working groups in the environmental sector under the Nordic Council of Ministers"

First the secretary of The Chemicals Group, *Magnus Nyström* from the Finnish Environment institute pointed out the importance of an open and informal cooperation between the authorities in the Nordic countries. The cooperation on this level does not require consensuses but is built on free exchange of views and experiences. Thus many activities can start before all members have agreed on all details. Activities on a Nordic level can - and in some cases even should - be expanded to other international levels such as European Union EU, the agreements on sea protection (HELCOM and OSPAR) and the cooperation between arctic regions (AMAP).
See appendix 14

The secretary of the Nordic Group on Monitoring and Data (NMD) *Harry Zilliacus,* also from the Finnish Environment institute, continued by emphasising the so called "Nordic advantage". We can combine resources and use the special expertise of each country in an optimal way to the benefit of all participants. Specific Nordic climatic and social circumstances and common views have better chances to be taken into account on a broader international scene when they are presented in a coordinated way. The Nordic countries have a relatively long history of environmental awareness and thus many results and experiences that we bring about in the Nordic cooperation can be

useful for other parts of the external world. For example the NMD-group has developed a monitoring tool that is useful also elsewhere. He ended his presentation by hoping for continuing cooperation between the Nordic working groups.
See appendix 15

The secretary of the Nordic working group on sea and air *Gun Lövblad* from IVL in Sweden gave a presentation on the subject: Environmental Persistent Organic Pollutants (POPs) and the Role of the Nordic Working Group on Sea and Air.

A success story for the working group on sea and air pollution have been its activities to reduce sulphur emissions. A strong interaction between research and policy can generally characterize the work of the group. The group is now developing models useful as tools for efficient abatement strategies.

The group have several priorities for the future activities presented on their web-site at address nmr.ivl.se. As such prioritised activities she mentioned POPs sources and relationships between emissions and effects. A strategy will be developed for a meeting next spring.

A self evaluation of the activities of the group has resulted in quite encouraging results. However, the group have recently been worried by proposals on a broader mandate, made in connection to the reorganisation of the environmental sector of the Nordic Council of Ministers. According to these proposals the group should include tasks connected to atmospheric issues in its work.
See appendix 16

During the discussions after these three presentations *Albert Sigurdsson* from Iceland mentioned that some useful information on terrestrial monitoring can be found on the web site: www.hollver.is/ntem/

Roland Kallenborn from the Norwegian Institute for Air Research NILU gave a presentation on the subject "Sharing the Burden of Chemical Analysis"

Development of methods for sample treatment and analytical methods is a very complex and demanding work. The general trends are that the sensitivity and the selectivity increase. The costs for chemical analyses are generally dominating the total costs for monitoring and screening programs. More cost effective methods should be developed so that scientifically motivated sampling activities would not be cut down simply because of their costs.

There are several optional scenarios for this development
a)
- Compound specific specialization and "combined competence".
- Advantages: Cost efficient and good possibilities for quality assurance.
- Disadvantages: Contamination risks during transport, differences in methods and logistical problems.
- Possible consequences: Few impulses for method development. There are only few specialized labs compared with the large variety of sample types.

b)
- A matrix specific specialization and "combined competence".
- Advantages: the same as for a).
- Disadvantages: Contamination risks during transportation, demands continuous method intercalibration and coordination of sampling and sample distribution.
- Possible consequences: A broad contaminant spectrum for some sample types but few impulses for method development and inclusion of other types of samples.

c)
- Nordic topic centres and national analytical networks.
- Advantages: cost efficient and inclusion of specialized institutions from existing national and Nordic networks.
- Disadvantage: Demanding coordination and a continuous quality control must be improved.
- Possible consequences: Flexible response to changing needs. Participating institutions should be given criteria for quality control, cooperation and method development.

One basic criterion for the reliability and efficiency of monitoring is that it must be cost efficient to allow continuity. Other criteria are that all methods must be quality assessed and the program must be responsive to changing needs.

During the discussion after this presentation it was stated that Denmark now has only twelve efficient labs which is minimum for quality check. Topic centres were generally considered as preferable compared with compound- or matrix-specialized labs. The Nordic countries are together not big enough and other (also industrial) labs should be involved in the networks.
See appendix 17

Bente Nyeland from the National Environmental Research Institute NERI / DMU was invited to speak about some Danish experiences of joint programmes. Unfortunately she had to cancel her participation and her contribution is reflected only in the abstract, which was distributed before the workshop.
See appendix 18

Manuela Notter from the Swedish Environmental protection Agency finalized the session with her presentation on the topic: "When do We Gain from Nordic Cooperation? When do we not?"

Issues for cooperation should be chosen because they are considered as useful and they should be put on the political agenda in a very conscious way. The main goal for chemical management is to avoid risks and thus to minimize the discharges and emissions of artificial chemicals. Public information about identified risks is important to create political pressure to support necessary measures. Initiatives for cooperation should have broad support. For a cooperation to be successful it is important that the participating Nordic countries should have access to high competence that can be utilized efficiently.

The speaker mentioned several areas suitable for united Nordic actions. Among them:

- Efforts to increase sectoral responsibility by making information more readily available
- improvement of knowledge about chemicals, analytical methods, sensitive matrices and specific Nordic circumstances
- development of biological test methods for integrated monitoring
- compilation of data for risk assessment
- presentation of information to politicians, actors on the market, pressure groups and citizens.

See appendix 19

Group discussions

Three groups were established and this time the organizers gave each group different topics for their discussions. After the discussions each group reported their conclusions.

Group I
Chairperson: *Ola Glesne*
Rapporteur: *Johanna Peltola*
Question:

Questions for group 1 on cooperation in selecting substances.

What are the selection criteria for screening/monitoring?

Background: previously we have mentioned some criteria:
- We have some indications that the substance represents a problem, but there is no proof
- We know that the substance represents a problem, but we do not know the extent of the problem
- We lack measuring data from the Nordic countries
- We lack measuring data for a risk assessment
- The substance is not already restricted or banned
- We do have established methods for analysis of the substance
- There is a good possibility to have a successful screening of the substance
- The substance is in mandatory or recommended international priority lists (example EU chemicals list)

Participants have mentioned the following substances during the discussions of the workshop: Polyfluorinated compounds (PFFOS), brominated flame retardants, chlorophenols, chlorinated paraffins, musk substances, phtalates, alkylphenols, triclosan……..

The group reported i.a. the following notations and conclusions concerning selection criteria for screening/monitoring:

- Some criteria are opposing each other
- Many substances on the monitoring lists are already banned. Although a substance is banned, it might still cause problems and there is no recent monitoring material available. Screening can then give reason for risk reduction activities such as speeding up or intensifying waste management, remedial measures, etc. taking into account also degradation products.
- In principle selection of an already restricted substance should be avoided, although taking into account the above mentioned reasons for occasional exceptions.
- Are common Nordic threshold values for properties leading to prioritisation necessary?
- Persistency, in a broad sense, is one key criterion.
- Potential for long-range transport is not by itself a selection criteria, but such

potential should be checked during the selection process.

- Should we exclude a chemical from the selection because of certain properties?
- We may have chemicals on a list for monitoring according to different criteria. For example chemicals included in mandatory monitoring programs come first, then chemicals of general concern, then chemicals with clear POP properties etc.
- Prioritisation work done in the OSPAR Hazardous substances -project should be consulted as well as other priority lists from international fora: WFD work, UNECE work
- When increasing concentrations of a substance in one monitored matrix (e.g.Cd; e.g. human milk) is observed this should lead to screening of this substance also in other relevant matrixes
- Only a dynamic screening program can notice something new. At its best a screening program works as an early warning system. More static monitoring programs are generally not that good for new signals.
- A mechanism for further agreement on screening programs should be developed in Nordic cooperation. The Nordic Chemicals Group could discuss how to start a project or some other mechanism that could arrange meetings once or twice a year to coordinate and choose substances for monitoring and screening. This proposed screening project should then cooperate with other relevant projects.
- The natural method to proceed is "Learning by doing".
- Information sharing: (example Sweden produces the background documents for NOVA)
- Can need for information exchanges be used as a criterion?
- Models can also be used in the selection. Examples are QSAR, EUSES etc.
- We should not waste too much time for creating criteria for a first screening: if we want to do screening in 2002, we cannot go too far for the selection process. Start with commonly used substances that we have already detected in the scientific community. In the start avoiding a too narrow and restricted process for selection is important. Each participating country could choose one priority substance.
- The Nordic relevance as a selection criterion must not be forgotten (geographical, evidence of bioaccumulation in our ecosystems,…)

Group II
Chairperson: *Alec Estlander*
Rapporteur: *Poul Erik Andersen*
Questions:

Questions to group II on the scope of cooperation

Should Nordic cooperation be open for neighbours?
- Benefits?
- Risks?
- Means and fora for expanded cooperation

When becomes the work on a Nordic level a burden?
- Which (important) tasks should be left for efforts on other levels (local, national <-> EU, global)?

The group reported the following conclusions:

The group started the discussion on the openness of Nordic cooperation by discussing the definition of "neighbour". Depending on the context, a relevant neighbour may be one, a few or all of the following: Baltic countries, Russia, Poland, Germany, Great Britain (or sometimes just Scotland), Benelux, North America....

The benefits of open cooperation are different for different parties.
For the Nordic Countries:
- data from larger areas
- political goodwill
- learning
- sharing of resources.

For neighbours
- learning (transfer of methods etc. to EU-candidates)
- influence at political levels (EU-candidates)
- coordinated selection of substances (all parties)
- sharing screening and monitoring data (all parties).

Among the risks or challenges associated with open cooperation the group identified that the starting points for different participants may be very different. Agreeing can also be difficult if the cooperation grows into a large bureaucracy. The group agreed that the leaking of knowledge is not a reason for concern.

As suitable means for expanded cooperation was mentioned involvement of experts in strategic work (planning) on all levels. Within the framework of the Nordic Council of Ministers workshops, common projects, sometimes preceded by national or bilateral pilot screening projects, can be used.

Concerning the question on when cooperation on a Nordic level becomes a burden the group made the following observations:
- We should deal with some issues (for example traffic pollution) at higher

international levels.

- Areas where the differences are so big that efforts to cooperate are futile should be avoided.
- Addressing this question at an early stage of planning is important, to avoid waste of work.
- Some issues should be dealt with at a geographically more restricted level. Cooperation on Atlantic issues or issues for the Baltic sea region must not involve parties which are not naturally concerned. Also certain industrial branches are represented only in some of the Nordic countries and the others should not be forced to participate in cooperation related to such branches.

Group III
Chairperson: *Sigurbjörg Gisladottir*
Rapporteur: *Susanne Boutrup*
Questions:

Questions to group III on special considerations for different projects

What are the differences and similarities in screening of POP's and organic non-POP chemicals?

What are the consequences of the differences when we shall design the screening programmes of different chemicals?

Which matrices can be used for sampling in all the Nordic countries?

The group reported the following conclusions

Concerning the first question on the differences and similarities in screening of POPs and non-POPs the group made the following observations:

There is no clear border between POPs and non-POPs. Although POPs are typically transported long distances while non-POPs are supposed to be found closer to the sources also non-POPs can occasionally be found far from the sources. The "history" of the substances must be taken into account when designing screening and especially the volume of the use.

POPs and non-POPs act in different manners in and between different matrices. Examples are many polyaromatic hydrocarbons (PAHs) in air and sediments. On the question on the consequences of these differences when designing screening programmes, the group noted that there are no really essential differences. However the focus will be on more remote areas the more persistent the substance is. Especially for non-POPs it is also important to pay attention to the transformation compounds.

Generally the group emphasized that all available information on the properties of the chemicals must be collected before the screening programme is designed.

The programme can be designed according to a two-tier approach: first a "detection" phase close to the sources and if the substance is found in relevant concentration the programme could move to a "screening" phase including more remote areas.

When discussing the third question, concerning which matrices could be used for sampling in the Nordic countries the group noted that choosing a species that can be found in all the countries is difficult. For POPs humans are the best species and these compounds have also been monitored in breast milk. For non-POPs it depends on the properties of the substance. Possibilities may be sediment, water and bile.

Plenary session 4:

Summary, conclusions and follow-up

At the end of the third day the final plenary session was led by the chairman of the organizing committee *Alf Lundgren* from the Swedish Chemicals Inspectorate. *Magnus Nyström* from the Finnish Environment Institute and secretary of the organizing committee was rapporteur.

According to the chairman the main goal was to develop a summary of the three previous sessions, with conclusions concerning the central information needs today and tomorrow, the prioritised pollutants, and how to monitor and screen them on an international scale. Also the justification for, and the focus of, Nordic cooperation was pondered.

The main conclusions were formulated in three blocks:
A Priority settings and criteria for selection of chemicals
B Design of cooperation activities
C Follow-up actions

Ola Glesne from the organizing committee presented the following conclusion on the priority setting and the selection criteria for screening/monitoring:

Conclusions A: Priority settings and criteria for selection of chemicals

1. We have indication that the substance represents a problem, but there is no proof
2. We know that the substance represents a problem, but we do not know the extent of the problem
3. We lack measuring data from the Nordic countries
4. We lack measuring data for a risk assessment
5. **The substance is not already restricted or banned**
6. We do have established methods for analysis of the substance
7. There is a good possibility to have a successful screening of the substance
8. The substance is in mandatory or recommended international priority lists (example EU chemicals list, EU WFD list, OSPAR-list, perhaps UN/ECE-list)
9. The substance is persistent (broad meaning of persistency)
10. Increased concentration discovered in one matrix.
11. Existing preparatory information already exists.
12. The screening will deliver data of relevance to all the Nordic countries.

Some criteria are opposing each other, but we do not see that as a severe problem. Neither do we see it as a problem that there are many criteria.

The strategic needs for data in the Nordic countries and in international processes where these countries participate should be central in the discussions about the selection of substances. Further we think the needs of the NMR chemicals group are central to the priorities.

It is important that a screening program is dynamic and flexible enough to cover the important user needs. It is also important that we closely connect the steering organisation of the screening project to the user needs mentioned above.

All speakers agreed that criteria no five is very important, but there may be situations where a banned substance still creates health or environmental problems that are relevant for a screening programme.

Models can be used in the selection (QSAR, EUSES etc.)

Alf Lundgren presented shortly the preparatory work.

Discussions pointed out that also material outside the chemicals legislation should be included (e.g. registers on pharmaceuticals and other sources of knowledge)

Britta Hedlund presented the conclusions on screening project design.

Conclusions B: Design of cooperation activities

When planning a project one should be able to answer the questions where, what, when and how should the sampling and determinations be done. The plan includes a sampling strategy, definition of matrixes and a development of methodology.

Three stages were identified during the seminar:
Stage 1: detection at most likely spots and performed by one country.
Stage 2: screening involving at least two countries while we can concentrate analyses to one lab.
Stage 3: monitoring in which generally all countries are involved.

We should utilise an existing sampling infrastructure when feasible (e.g. EMEP).

A good starting point is sewage sludge. Long term effects can be studied in sediments. Useful samples can also be human: milk, urine, serum. Generally 30-100 samples from the Nordic countries are sufficient, but this depends on the sources.

When we plan monitoring the following aspects should be considered:
- Select media that we can compare.
- The selection of a matrix depends on the substance.
- Joint monitoring done simultaneously under equalized circumstances, such as temperature span and other factors.
- A manual for the sampling should be prepared.
- Analysis in one laboratory or intercalibrations!
- Dividing the substances between the countries

An approach with indicator substances is generally difficult. It requires a screening stage and then selection of one compound for a given set of properties. The approach can be used for finding priority substances for further actions.

To use simplified methods can be an advantage in screening. For example one should select just one certain media if possible. Also other involved parameters could possibly be simplified but this is more important in monitoring than in screening.

During the last group discussions Group III discussed the differences and similarities in screening of POPs and non-POPs. They concluded that there is no clear border between POPs and non-POPs. POPs are long range transported while non-POPs generally appear closer to sources, even if one cannot exclude long range transport for non-POPs either. "The history" of the substances must be included in designing the screening - especially information on volume of production and use. Finally the group concluded that POPs and non-POPs act in different manners in and between different matrices. Examples are many PAHs in air and sediments.

The group III addressed the question of which matrices could be used for sampling in the Nordic countries. The group noted that it is difficult to choose a species which can be found all over in the Nordic countries. Human breast milk can be used for monitoring of POPs. For non-POPs the options depend on the properties of the compound. The group presented as possible matrices sediment, water and bile. During the discussion also other species were suggested: fox (or arctic fox), shrew and reindeer.

Finally some follow-up actions were discussed. Possible fora and directions for further action were proposed. *Alec Estlander* presented follow-up actions:

Conclusions C: Follow-up actions

A project application on screening should be presented to the Nordic Council of Ministers. The following project can then be allocated at a suitable working group. One proposal is that the Nordic Chemicals Group should administer the project.

At a later stage neighbouring countries should be invited to participate in the screening project.

Another workshop between involved working groups could be considered in a couple of years.

Horizontal cooperation between the working groups has been desired in many connections. Cooperation should be carried out by different means:

- normally between the secretariats of the working groups
- by representability of the groups in the project group and
- in a couple of years possibly another workshop.

Information on the results and proposals should be forwarded to the Nordic Council of Ministers' environmental Committee of Senior Officials ("Ämbetsmannakommittéen - Miljö"). This body is expected to direct feasible means for the further follow up activities in connection with the organisational reforms. The chairmen and secretaries of the working groups should coordinate their information exchange.

The chairman of the Nordic Chemicals G roup *Esa Nikunen* promised to discuss the tasks at the next meeting of his group. Finally he thanked the organizing committee for the workshop before the chairman of both the last plenary session and the organizing committee *Alf Lundgren* closed the workshop.

Nordic Workshop on Environmental Monitoring of Chemicals in Use

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List of Appendixes

(Abstracts, slides or overheads)

Plenary Session 1

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Esa Nikunen: "Information needs based on the state of the environment; A regulator's perspective." (Abstract + slides)

Appendix 2
Alf Lundgren: "Are there specific requirements for screening and monitoring of chemicals in use?" (Abstract + slides)

Appendix 3
Jens Brøgger Jenssen: "The Danish environmental authorities' considerations leading to NOVA 2003." (Slides)

Appendix 4
Roland Kallenborn and *Per Erik Iversen:* "International monitoring activities under AMAP, EMEP, CAMP." (Abstract + slides)

Appendix 5
Bo Jansson: "Visions of international cooperation." (Abstract + slides)

Plenary Session 2

Appendix 6
Bert-Ove Lund: "NSDB A Nordic database for priority setting of hazardous chemicals" (Abstract + tables)

Appendix 7
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Appendix 8
Harald Sørby: "Industrial reporting of releases of chemicals in Europe (European Pollutant Emission Register, EPER); experiences from the Norwegian PRTR)" (Abstract + slides)

Appendix 9
Poul Erik Andersen: "SPIN (Substance and Products in the Nordic countries) Increasing the availability of data from the Nordic Product Register." (Abstract + slides)

Appendix 10
Eva Brorström-Lundén: "The HCBD case: On how to design a screening programme" (Abstract + slides)

Appendix 11
Ola Glesne: "A joint Nordic screening programme" (Abstract)

Appendix 12
Britta Hedlund: "The Swedish screening programme" (Abstract + slides)

Appendix 13
Johanna Peltola: "Screening projects in Finland" (Abstract + slides)

Plenary Session 3

Appendix 14
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Harry Zilliacus:, "Reflections from the Nordic Group on Monitoring and Data (NMD)" (Abstract)

Appendix 16
Gun Lövblad: Environmental Persistent Organic Pollutants (POPs) and the Role of the Nordic Working Group on Sea and Air. (Abstract + slides)

Appendix 17
Roland Kallenborn: "Sharing the Burden of Chemical Analysis" (Abstract + slides)

Appendix 18
Bente Nyeland: Some Danish experiences of joint programmes. (Abstract)

Appendix 19
Manuela Notter: "When do We Gain from Nordic Cooperation? When do we not?" (Abstract)

Appendix 1 (E. Nikunen: Abstract)

Workshop 6-8 June 2001 Sigtuna

***Esa Nikunen**, Finnish Environment Institute, Chemicals Division*

INFORMATION NEEDS OF CHEMICALS IN THE ENVIRONMENT -A REGULATORS PERSPECTIVE

For which purposes the information is needed

Today, a sound management of chemicals is in most cases based on **risk assessment**. This is the case in for example:

- new and existing substances
- plant production products and biocides
- bans & restrictions of hazardous chemicals.

As there are more than 30 000 substances on EU market, all of them cannot be evaluated. The **priority setting** should be based on the knowledge on the effects and exposure.

In the riks assessment and priority setting, measured environmental concentrations are often more valid than results from model calculations.

International agreements and regulation posing needs for chemical exposure and fate information

OSPAR and HELCOM hazardous substances strategies and EU regulation are the only international measures where monitoring data on chemicals in use is needed to confirm the implementation.

UNEP and UNECE POPs frameworks: concerns mainly those substances which are already reasonably well monitored and restricted in the Nordic countries and EU.

In EU especially the Water Framework Directive sets high requirements for future monitoring of hazardous substances.

What chemical exposure/fate information should be gained?

The substances/chemicals which are so far included in the national or international monitoring or assessment programs are mainly those which have been restricted already: data is not particularly useful for chemicals risk management. More substances should be included in monitoring programmes.

Time trends of environmental concentrations essential for risk management purposes - specimen bank and sediment analysis important.

Urban environment monitoring should be increased: most of the chemicals may stay in the urban environment and on the other hand it serves as early warning for larger environmental exposure.

Data on the most important degradation/reaction and metabolic products of the substances needed.

Information needs: regulators perspective

Esa Nikunen

FINNISH ENVIRONMENT INSTITUTE

Workshop on Monitoring the Environmental Fate of Chemicals

Sigtuna 6.6. 2001

Why? What? Who? When?

Why information on fate?

- ✓ Risk assessment & priority setting
- ✓ Focus & steering of monitoring
- ✓ To assess the adequacy of measures taken
- ✓ Emission control
- ✓ International commitments
- ✓ Right-to-know, recommendations

RA & priority setting

- ✓ Lack of data on most substances
  - ✗ industry to create & deliver?
- ✓ Measured data better than calculated
- ✓ Screening information often sufficient

International agreements (1)

- ✓ HELCOM
  - Agricultural pestices should be monitored (in agreement). Recommendation on DDT
  - Cooperative Monitoring in the Baltic Marine Environment (COMBINE)
- ✓ OSPAR
  - Joint Assessment and Monitoring Programme (JAMP)

International agreements (2)

- ✓ Rovaniemi declaration -91
  - Arctic Monitoring and Assessment Programme (AMAP) (2nd phase: heavy metals, PAH, PCB, old pesticides, dioxines)
- ✓ UN-ECE
  - LRTAP -79: EMEP. Monitoring on VOC, heavy metals, POPs.
  - Aarhus protocols

EU legislation (1)

- ✓ Existing substances regulation:
  - data needed for prioritised substances (145)
  - Focusing of the assessment & support the conclusions
  - local, regional and continental PEC
  - indirect human exposure
  - data /estimates needed on water, aquatic organisms, earthworms, drinking water, feed
  - spatial and temporal variations should be covered

EU legislation (2)

- ✓IPPC directive
  - Emission permits for large plants, EPER
  - Need to update the list of substances
- ✓Biocides & Plant Protection Products
  - Preliminary approvals system
  - Need for environmental follow-up

EU legislation (3)

- ✓Water framework directive:
  - EQS for EU and national priority substances
  - selection and prioritisation: 33 substances on the first draft EU list (COMMPS)
  - water, sediment & organisms + ground water
  - surveillance, operational and investigative monitoring

Present situation

- ✓ data available on only few substances - most of them banned or severely restricted
- ✓ results often temporally and locally limited
- ✓ result often difficult to find

Future situation

- ✓ Risk Assessment & Reduction
  - ➔ authorities could reallocate resources
  - ➔ industry's role to be activated
  - ➔ need for new guidelines & cooperation

Items for future work

- ✓ decrease monitoring of severely restricted chemicals if concentrations low / falling
- ✓ inclusion of other chemicals in a screening programme - need for flexibility
- ✓ data should reflect spatial and temporal variations
- ✓ better dialogue needed between RA, RR & monitoring communities

Items for future cooperation

- ✓ Water framework directive
- ✓ More screening needed on more substances
  - division of work?
- ✓ Implementation of polluter pays principle?

Are there specific requirements for screening and monitoring of chemicals in use?

by

Alf Lundgren, National Chemicals Inspectorate (KemI), Sweden

Issues on chemical safety have received an increasing attention for some time and will probably be an even more important issue for the future. Our knowledge on the state of the environment regarding chemicals is, however, poor with the exception of the classical POPs (DDT, PCB, etc.) and a limited number of metals. Very few of the organic chemicals in use today are included in any monitoring programs, but the need for monitoring data is becoming more and more pronounced.

The challenge we are facing is to meet those needs and to come up with solutions on how to handle the large number of chemical substances in use and how to monitor them taking into consideration their variations in space and time in an economically feasible way.

Monitoring of chemicals in use can serve different purposes like priority setting, risk assessment, follow up of environmental quality standards and risk reduction measures, etc. The focus of such monitoring is often directed towards a relatively rough picture of the present situation in the environment, close to the sources as well as in less affected areas. This is in contrast to traditional monitoring, which is often focusing on long term trends in remote areas.

As environmental monitoring is a costly activity much effort and resources must be devoted to planning the programs, starting with a clear definition of the purposes. The further preparatory work should cover information on the use of chemicals and their flow in the technosphere, releases into the environment, identification of hot spots, environmental behaviour and fate and the use of multi compartment models. The spatial and temporal scale will be discussed. A tiered approach will be examined starting with the screening of single substances in a synoptic survey and a discussion on how to proceed when there is a need for follow up or further improvement of precision and accuracy.

Are there specific requirements for screening and monitoring of chemicals in use ?

NCM Workshop on Monitoring the Environmental Fate of Chemicals

June 6. 2001

Alf Lundgren, Kemi

Contents

- What is the purpose of monitoring ?
- The importance of a reference
- Priority setting
- Prerequisites
- Screening – and then what ?
- Concluding remark

Monitoring

- Monitoring:

"Surveillance undertaken to ensure that previously established quality control conditions have been met."

(Hellawell, 1978)

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Monitoring

Surveillance:

"A systematic and orderly gathering of data through time"

(Hellawell, 1978)

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Environmental quality objectives

"The environment must be free from man-made substances and metals that represent a threat to health or biological diversity. This means that:

- the levels of substances that occur naturally in the environment must be close to background levels
- the levels of man-made substances in the environment must be close to zero."

Swedish Gov. Bill 1997/98:145 "Swedish Environmental Quality Objectives"

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Environmental quality objectives

- Approaches:
  - comparison with and trends in "background" levels
    - Uncertainty issues handled in the classical 90 or 95% conf .int. perspective
  - risk based approach
    - Uncertainty issues handled in the PEC/PNEC perspective

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Risk based approach

- Examples:
  - Risk (exposure) assessments and follow up (existing and new chemicals, plant protection products, biocides, etc)
  - Follow up of environmental quality standards (The Framework Directives for water and air, Dir. 76/464, Directives for fish and shellfish, etc)

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Risk Assessment

- Tiered approach
  - A logical development towards more realistic data and assessment applying the precautionary principle
    conservative ⇨ realistic
  - High degree of uncertainty ⇨ low degree of uncertainty
  - Cost effective
  - Flexible use of all available data data

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Risk Assessment

Effektanalys

NOEC

(No Observed Effect Concentration)

Assessment factor ⇩ *(10 -1000)*

PNEC

(Predicted No Effect Concentration)

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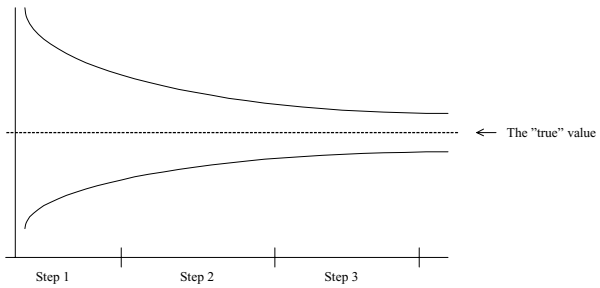

Refined analysis reducing uncertainty

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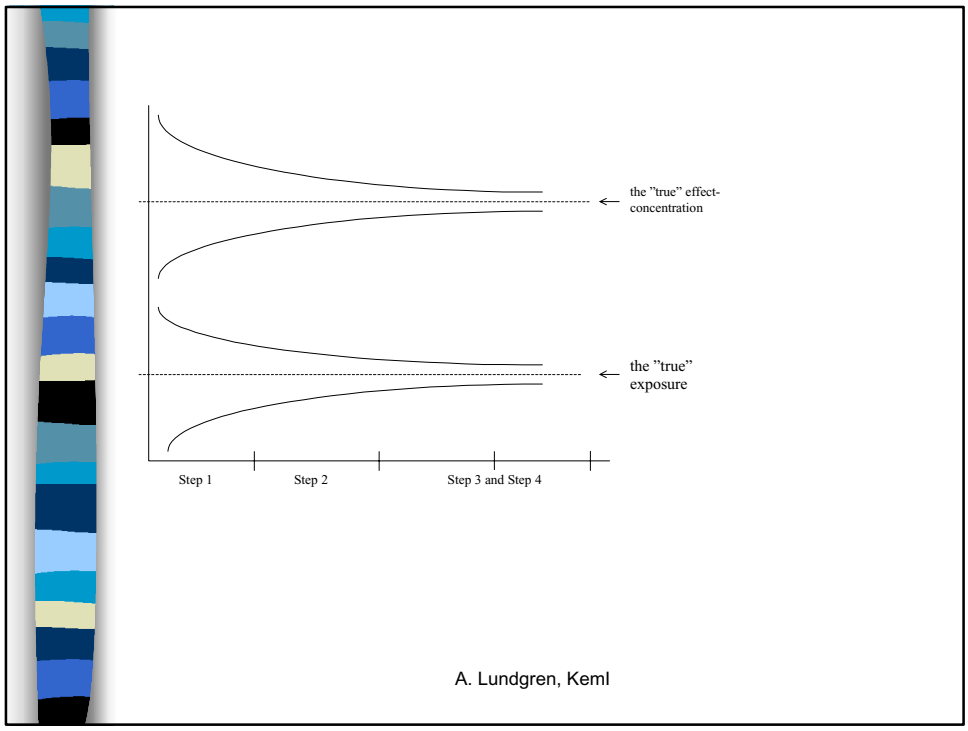
the "true" effect-concentration
the "true" exposure
Step 1
Step 2
Step 3 and Step 4
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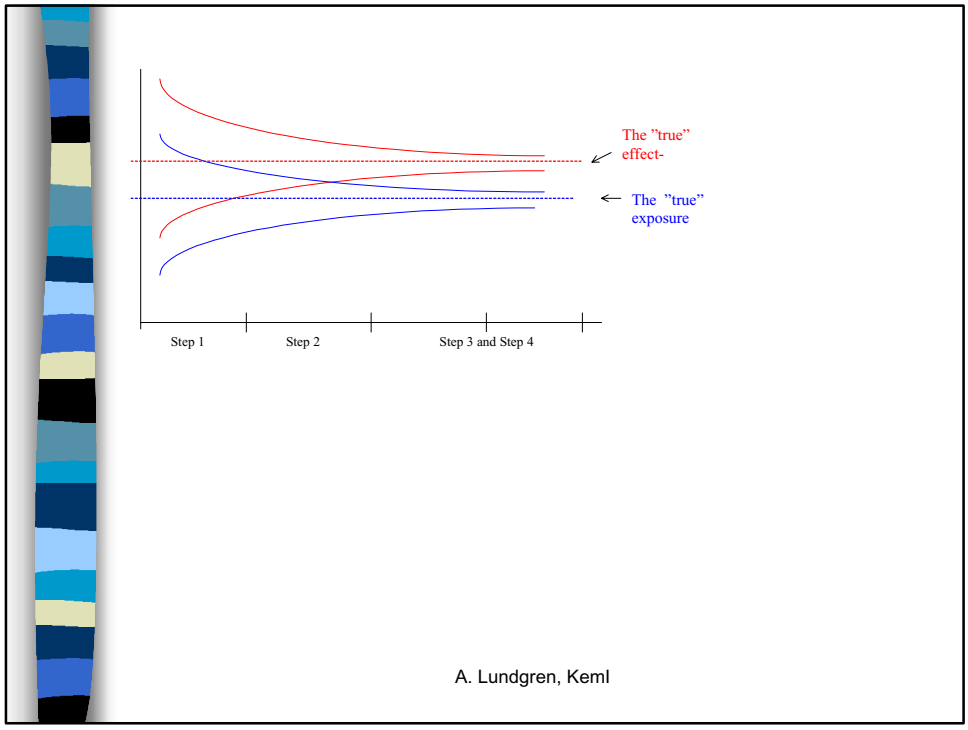
The "true" effect-
The "true" exposure
Step 1
Step 2
Step 3 and Step 4
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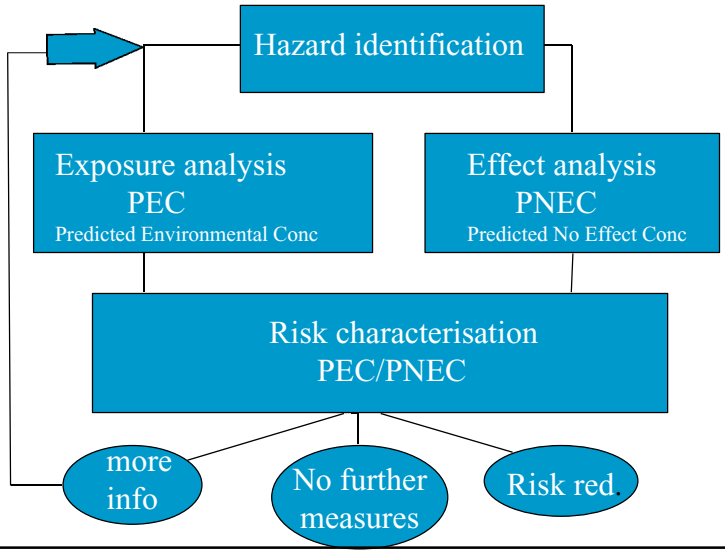
Principles for risk assessment



Priority setting

- Prediction of Possible Presence of Pollutant Chemicals in the Environment
  - Japanese model: independant factors: **annual production, use pattern, Kow, (**water solubility and biodegradability**)** Result: absence 94%, presence 76% (Ikeda et al 1978)
  - Pesticides in Sweden: Quantities used explained 50-85% of the variation in surface water concentrations. Adding intrinsic properties increased the prediction to 70-95%. Kow most importand factor. (Kreuger and Törnqvist, 1998)

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Priority setting

- Use all available, relevant information in a systematic way for priority setting and planning
  - Note importance of used volume and use pattern
  - Sources of information: see Session 2

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Prerequisites

- Representativeness:
  - Spatial scales: Local, regional, continental/global
  - Temporal scales: consider sources and use pattern
  - ”reasonable worst case”, ”typical” values
- OECD:s check list
- Consider a tiered approach, starting with screening

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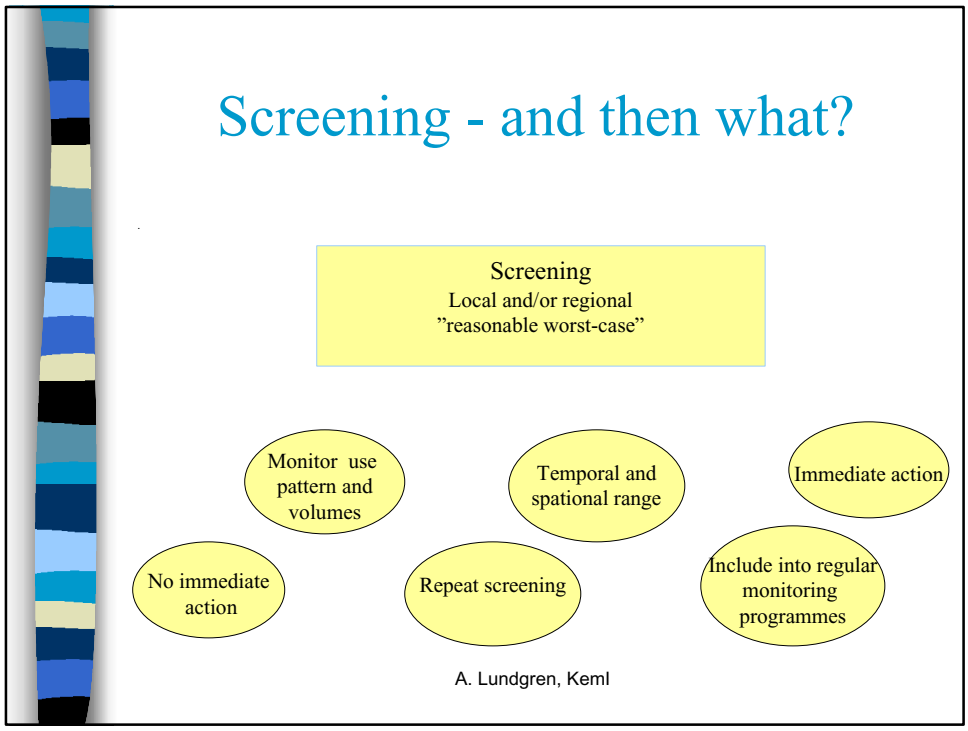
Screening - and then what?
Screening
Local and/or regional
”reasonable worst-case”
Monitor use pattern and volumes
Temporal and spational range
Immediate action
No immediate action
Repeat screening
Include into regular monitoring programmes
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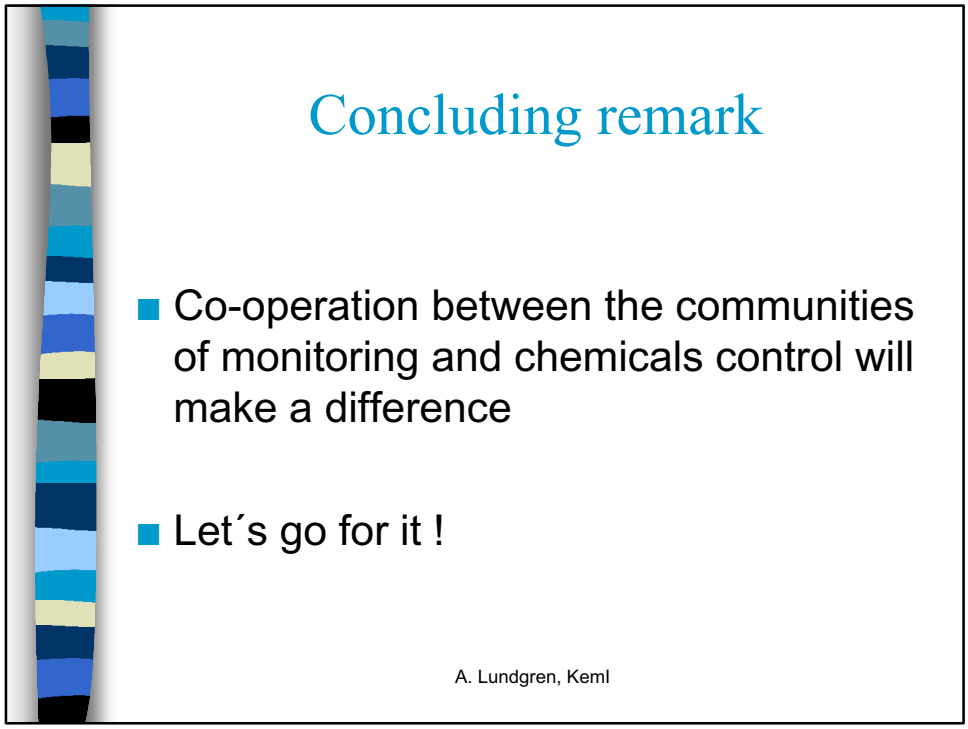
Concluding remark
Co-operation between the communities of monitoring and chemicals control will make a difference
Let´s go for it !
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Considerations leading to inclusion of chemicals in NOVA 2003

by

Jens Brøgger Jensen

Danish Environmental Protection Agency

NOVA 2003
Danish National Monitoring Programme for the aquatic environment
1998 - 2003

Purpose:

- Assessment of quality status and impact
- Documentation on
  - achievement of quality objectives
  - effectiveness of measures
- Contribute to the background for further decisions regarding measures

NOVA 2003

Work principle:

- ”systematically repeated data collection, handling and assessment over time of a given set of information according to a prearranged design”

Why include chemicals in the monitoring programme ?

Purpose:

- Comply with commitment and obligations
- Justification and documentation on achieving national and international objectives
- Assessment of effectiveness of measures
- Reference point/Impact identification
- Increased knowledge about occurrence

What was the universe of substances to be considered ?

Basic Considerations:

- EU Directives
  - 76/464/EEC List I and II (including candidates for List I)
  - Drinking Water
- OSPAR and HELCOM Joint Monitoring Programmes
- North Sea Conference list A
- Danish EPA Chemical Strategy
  List of undesired substances

What substances should be included ?

Selection and de-selection criteria:

- Relevant for occurrence in the aquatic environment
- Information in the Danish Product Register on use categories and amounts
- Results from previous screening programmes
- Specific industrial productions and use applications
- Precautionary principle and substances of concern
- Substances banned - not included. However!
- Results “for free”

Where to monitor ?

Sources and media:

- Point sources
  - Municipal waste water treatment plants
  - Industries
  - Storm water, sparsely build up areas, aquaculture
- Ground water, Rivers, Lakes and Marine areas
  - matrix (water, sediment, biota)
  - substance pathways and affinity
  - load calculations/concentrations
  - biological effects

How how many substances and how much should be monitored at various places?

Pragmatic approach:

- Number of substances in point source monitoring depending on source characteristics
- Representative source monitoring
- Media monitoring depending on possible sources in the catchment area
- Meeting international monitoring obligations

Feasibility considerations

Strategy on Quality Assurance:

- Available methodology on chemical analysis and sampling
- Setting up Quality Control procedures
- Performance testing and accreditation
- Expected environmental concentrations and detection limits
- Preparation of Data Sheets

NOVA 2003 list of substances

Stof/stofgruppe	CAS nr.	LOOP		Grundvand	Vandløb	Søer	Punktkilder			Marine områder			Luft	Udvælgelses- kriterier
		Gylle	Dræn		Vand	Vand	Rensningsanlæg	Industri	Regnvand*	Vand	Sediment	Biota		
							Spilde vand	Slam						
Tungmetaller og uorganiske sporstoffer mv.														
Aluminium (Al)	7429905	x	-	x	-	-	-	-	x	-	-	-	x	DV-dir
Antimon (Sb)	7440360	-	-	x	-	-	-	-	x	-	-	-	-	LII, DV-dir
Arsen (As)	7440382	x	-	x	x	x	x	x	x	-	-	-	x	LII, DV-dir, NSC
Barium (Ba)	7440393	x	-	x	-	-	-	-	x	-	-	-	-	LII, DV-dir
Bly (Pb)	7439921	x	-	x	x	x	x	x	x	-	x	x	x	LII, bkg. Ø23, DV-dir, HEL, OSPAR, NSC
Bor (B)	7440428	-	-	x	-	-	-	-	x	-	-	-	-	LII, DV-dir
Bromid (Br)	24959679	-	-	x	-	-	-	-	x	-	-	-	-	Fsp.
Cadmium (Cd)	7440439	x	-	x	x	x	x	x	x	-	x	x	x	LI*, bkg. Ø23, DV-dir, HEL, OSPAR, NSC
Chrom (Cr)	7440473	-	-	x	x	x	x	x	x	-	-	-	x	LII, DV-dir, NSC, HEL
Cyanid (CN-)	57125	-	-	x	-	-	-	-	x	-	-	-	-	LII, DV-dir
Iodid (I-)	20461545	-	-	x	-	-	-	-	x	-	-	-	-	Fsp.
Kobber (Cu)	7440508	x	-	x	x	x	x	x	x	-	x	x	x	LII, DV-dir, HEL, OSPAR, NSC
kobolt (Co)	7440484	-	-	-	-	-	-	-	x	-	-	-	-	LII
Kviksalv (Hg)	7439976	-	-	x	x	x	x	x	x	-	x	x	-	LI*, bkg. Ø23, DV-dir, HEL, OSPAR, NSC
Lithium (Li)	7439932	-	-	x	-	-	-	-	x	-	-	-	-	Bgsn., Fsp.
Molybdæn (Mo)	7439987	-	-	x	-	-	-	-	x	-	-	-	-	LII, Bgsn.
Nikkel (Ni)	7440020	x	-	x	x	x	x	x	x	-	x	x	x	LII, bkg. Ø23, DV-dir, NSC, HEL
Selen (Se)	7782492	x	-	x	-	-	-	-	x	-	-	-	x	LII, DV-dir
Strontium (Sr)	7440246	-	-	x	-	-	-	-	x	-	-	-	-	Bgsn., Fsp.
Sølv (Ag)	7440224	-	-	x	-	-	-	-	x	-	-	-	-	LII, DV-dir
Thallium (Th)	7440280	-	-	x	-	-	-	-	x	-	-	-	-	LII, Bgsn.
Tin (Sn)	7440315	-	-	x	-	-	-	-	x	-	-	-	-	LII, Bgsn.
Titan (Ti)	7440326	-	-	-	-	-	-	-	x	-	-	-	-	LII
Vanadium (V)	7440622	-	-	x	-	-	-	-	x	-	-	-	-	LII, Bgsn.
Zink (Zn)	7440666	x	-	x	x	x	x	x	x	-	-	-	x	LII, DV-dir, HEL, OSPAR, NSC
Pesticider														
Aldrin	309002	-	-	-	x	-	x	x	x	-	-	-	x	LI*, NSC, OSPAR
Aminomethylphosphonsyre (AMPA)	1066519	-	x	x	x	x	x	x	x	-	-	-	-	DV-dir, Fsp.
Atrazin	1912249	x	x	x	x	x	-	-	x	x	-	-	-	DV-dir, NSC
Azinphos-ethyl	2642719	-	-	-	x	-	-	-	-	-	-	-	-	LI, NSC

Basis for future monitoring

Esbjerg Declaration § 17

"One generation target"

This implies the prevention of the pollution ofthe North Sea by continuously reducing discharges, emissions and losses of hazardous substances thereby moving towards the target of their cessation within one generation (25 years) with the ultimate aim of concentrations in the environment near background values for naturally occurring substances and close to zero concentrations for man-made synthetic substances.

Considerations for a revision

Selection Criteria (OSPAR):

to be used in this selection and prioritisation mechanism include that the substances or groups of substances:

(i) due to their highly hazardous properties, are a general threat to the aquatic environment;

(ii) show strong indications of risks for the marine environment;

(iii) have been found widespread in one or more compartments of the maritime area, or may endanger human health via consumption of food from the marine environment;

(iv) reach, or are likely to reach, the marine environment from a diversity of sources through various pathways.

(similar to the selection criteria in the Water Framework Directive)

Elements to be included in a revision

Changed policy:

- OSPAR (HELCOM)
  - Hazardous Substance Strategy - Priority Substances
  - Safety net
  - Validation of selection criteria
  - Revision of JAMP (including RID, CAMP and CEMP)
- Water Framework Directive
  - Priority substances
  - Obligatory monitoring requirements

Considerations for a revised assessment and monitoring programme

Fixed and Dynamic approach:

- Routine Programme based on traditional approaches
- Screening Programme, that is more than sampling and analysis
  - include information from various sources
  - acceptance of several levels of quality assurance
  - running a rolling analysis programme
  - take into account mutual benefit of co-operation at international level

Workshop on " **Monitoring the Environmental Fate of Chemicals"**

NMR Sigtuna 06 – 08.06 2001.

Plenary Session 1. International outlook : Current information needs from the chemicals control .

Theme 2 "State of the Art"

Overview of ongoing monitoring of chemicals/hazardous substances within the conventions and "ways ahead"

By Per Erik Iversen SFT, and Roland Kallenborn NILU

Monitoring of different hazardous substances has been an important issue in international monitoring programmes for more than 20 years. Due to cost and methodological restrictions in the beginning, only a few important compound groups were selected for comprehensive monitoring. The number of compounds monitored increased and quality assurance measures improved continuously during the years but, at present, there is still a long way to go in covering the actual needs – especially on "new substances".
Our presentation will consist of an "airborne" and an "aquatic" part. We will focus on the convention on Long-Range Transboundary Air Pollution (LRTAP) and the Oslo and Paris convention (OSPAR). However, the relevant monitoring work performed within the Arctic Monitoring and Assessment Programme (AMAP) and the Helsinki Commission (HELCOM) will also be discussed.
As contribution on airborne contaminants and transport of them, the European Monitoring and Evaluation programme (EMEP in LRTAP) and the Comprehensive Atmospheric Monitoring Programme (CAMP in OSPAR) will be used as examples. For the aquatic monitoring of antropogenic contaminants, we will present and evaluate the Joint Assessment and Monitoring Programme (JAMP) and the programme on Riverine Inputs and Direct Discharges (RID) within OSPAR. The work within AMAP is important for both atmospheric and aquatic monitoring. In addition the Cooperative Monitoring in the Baltic Marine environment (COMBINE in HELCOM) will be briefly mentioned and evaluated.
The "state-of-the-art" of international contamination monitoring within the different conventional programmes will be presented and critically evaluated. Discussions about obvious gaps, needs and limitations of comprehensive international monitoring as well as future monitoring aspects will be included in the presentation.

Overview of ongoing monitoring of chemicals/hazardous substances within the conventions and "ways ahead"

Part II: POP monitoring in the Atmosphere

Roland Kallenborn
Norsk institutt for luftforskning

NILU

General Background

Monitoring of persistent organic pollutants continuously performed in Norway at two sampling stations using standard 'high volume' sampling devices.

"Zeppelin mountain" atmospheric research station:
78.55°N, 11.56°E, 474 m elevation
Contributions to: AMAP and EMEP

"Lista fyr" atmospheric research station: 58.06°N, 06.34°E, 13 m elevation

Contributions to: EMEP, CAMP

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Monitoring programmes

European Monitoring and Evaluation Programme: EMEP in LRTAP

Not yet decided to be included: POPs (PAH, PCB, HCB, chlordane, lindane, α-HCH, DDT/DDE)

EMEP surveillance programme: 35 countries, 4 Nordic countries

Norway: 13 stations, 2 stations where POPs are measured and reported: Lista and Ny-Ålesund (Svalbard)

Comprehensive Atmospheric Monitoring Programme: CAMP in OSPAR

α- og γ-HCH and HCB in ambient air and deposition samples from Lista (South Norway)

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Monitoring Programmes cont.

Arctic Monitoring and Assessment Programme (AMAP)

All circumpolar nations participate in the monitoring programme:
POP compounds recommended for monitoring by AMAP:

Group		*Individual Compound*
Chlorobenzenes	*	Hexachlorobenzene (HCB), Pentachlorobenzene, Tetrachlorobenzene
Hexachlorocyclohexanes	*	α-,β-,γ- HCH
Chlordanes	*	*cis-/trans-* chlordane,
	*	*cis-/trans* -nonachlor, oxychlordane,
	*	heptachlor
		heptachlor- *endo-exo*-epoxide
DDT	*	4,4'-DDE,-DDD,-DDT
	*	2,4'-DDE,-DDD,-DDT
Mirex		Mirex
Toxaphene		Chlorobornanes #26 and #50
Dieldrin		Dieldrin, endrin
PCDD/F		2,3,7,8-tetra- to octachlorodibenzo-p-dioxins and furans
PCBs	*	30 selected polychlorinated PCBs specified in the AMAP report
Current used pesticides		Atrazine, chlorpyrifos, α-/γ -endosulfan, pentachloroanisole.
Other POPs		Pentachlorophenole, Brominated flame retardants (PBDE, PBB),Polychlorinated diphenyl ethers (PCDEs), PCB sulfones
Polychlorinated naphthalenes		Polychlorinated naphthalenes (PCN)
Short-chain chlorinated paraffins		C10-C13 chlorinated alkanes

Measured in air at the "Zeppelin mountain" station

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Present situation: lacks and challenges

- **The "Zeppelin mountain" atmospheric research station delivers a relatively comprehensive data set to the AMAP secretariat - more comparable data needed!**
- **Only a few selected compounds are continuously measured in air from at the South Norwegian station "Lista fyr" and reported to CAMP.**
- **A medium scale resolution covering more sampling stations in the network is recommended to cover long-range transport.**
- **The introduction of POPs in the official monitoring programme of EMEP is recommended for future monitoring**

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Conclusions and perspectives

•In order to monitor atmospheric long-range transport events from the middle latitude industrial and agricultural sources into the Northern regions a better resolution for POPs in air must be achieved involving sampling station from all Nordic countries into the Arctic.

•Screening studies of "new persistent pollutants" in the atmosphere should be evaluated for implementation in atmospheric monitoring.
Done for PCDD/F, dieldrin, endrin, endosulfan, chlorobornanes (NILU).

NILU

Visions of an International Cooperation

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A large number of measurements of chemicals in the environment are performed every year. Large resources are spent in this production and many of the resulting data are expensive. It is essential that these data are accessible for both primary and secondary users. A basic requirement for this is that there is a good communication between data producers and data users. The producers have to know what the users need and the users have to know what have been produced.

UNEP Chemicals is looking at the possibility to build a communication network for people working with data on chemicals in the environment. The Stockholm Convention on POPs seems to offer an opportunity to make an initial test of the network idea for this group of substances. The text of the Convention contains a paragraph saying that the Parties shall encourage and/or undertake appropriate research, development, monitoring and cooperation pertaining POPs. This includes "presence, levels and trends in humans and the environment" and "environmental transport, fate and transformation". In the following paragraph it is said that in doing this, the parties shall "support and further develop, as appropriate, international programmes, networks and organisations aimed at defining, conducting, assessing and financing research, data collection and monitoring, taking into account the need to minimize duplication of effort". The Convention text also contains an article on effectiveness evaluation. It asks for periodic evaluations, the first four years after the date of entry into force. At the first Conference of the Parties, it shall initiate the establishment of arrangements to provide itself with comparable monitoring data on the presence of POPs. This should be based on existing monitoring programmes to the extent possible and promoting harmonization of approaches.

The network was discussed at an UNEP expert consultation in early May, where most of the major organisations dealing with chemicals in the environment where represented. The meeting advised UNEP to build a network including the major data contributors in the first stage, with a possibility to expand it to a wider group at a later stage. The network should initially focus on POPs and POP candidates. A meta database with links to relevant sources would be set up at UNEP. The possibility to arrange an international conference on monitoring was also discussed. It was also disclosed at the meeting that regional networks where planned both in East Asia and North America. The possibility for a global cooperation seems to be good.

Visions of an International Cooperation

Professor Bo Jansson
Institute of Applied Environmental Research
Stockholm University

Increasing demands for monitoring

- Several international and regional programmes suggest increasing volumes of monitoring of chemicals in the environment
  - UNEP is planning to build capacity for monitoring of POPs in developing countries
  - WHO/GEMS/WATER is planning to increase the measurements of organic substances
  - The Water Framework Directive calls for a large number of measurements of chemicals

- The European Environment Agency calls for more Long Term Environmental Monitoring (LTEM)
- At the BFR2001 meeting it was concluded that more monitoring is needed for the brominated flame retardants
- Decreasing ADI for dioxins also calls for more measurements of those substances
- Endocrine disruptors
- Risk assessment

Important user-producer dialogue

- The aim with a new monitoring programme has to be discussed extensively between the data user and the data producer
- Possible secondary use has to be taken into account
- Links to regional and international programmes has to be identified

Programme design

- The design of a monitoring programme depends on many factors, such as
  - International and regional activities
  - Ongoing measurements
  - Predicted distribution of the chemical
  - Possibility to get representative samples
  - Possibility to make determinations that can fulfill the aim of the programme
  - Available resources

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Resources?

- At least some new funds for monitoring in international programs will be available
- Several national monitoring programmes have recently obtained increased funds
- Will the availability of human resources be the limiting factor?

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Priorities

- Decrease activities for less interesting parameters (= change ongoing programmes)
- Indicator substances (e.g. CB153 for PCB)
- Decrease number of sampling sites
- Decrease intensity (e.g. measure every Xth year and bank samples)
- Frequent reviews of studied parameters
- Cooperate with other programmes!

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Improved use of existing data

- There are a lot of measurements of chemicals in the environment done during the last decades
- The use of these are hampered by
  - Limited knowledge about their existence
  - Difficult to access the data
  - Difficulties to judge the quality of the data

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EEA reviews of ongoing monitoring in the EU

- One project looked at monitoring of some 90 compounds in the aqueous environment
- A second project reviewed the monitoring of some 25 compounds in non-aqueous media
- The results include several recommendations for changes in the ongoing programmes

Cooperation!

- The need for better cooperation is obvoius, both globally and regionally (and sometimes also on a national level)
- Bottom-up approach is difficult
- There are some top-down examples available, and those seem to be succesful

UNEP POPs

- The Stockholm Convention was signed a couple of weeks ago
- Except for the measures described for the twelve POPs, the text describe how further substances can be added to the list
- The text also say that the success of the convention has to be reviewed

”Regional Assessment of PTSs”

- UNEP/Chemicals in Geneva has initated a project which will try to gather as much information on Persistent Toxic Substances as possible globally
- It is expected that this project will meet a lot of problems to find and use these data
- Areas with serious data lack will is expected to be identified

”UNEP Network for Monitoring Programmes”

- This project will (probably) fulfill three purposes
  - To establish POPs monitoring in regions where serious data gaps have been identified
  - To establish a programme to monitor the success of the Stockholm Convention
  - To build a network for effective communication between people professionally active in monitoring of chemicals in tteh environment

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A UNEP expert consultation

- Representatives of the major international and regional programmes for monitoring of chemicals in the environment were gathered in Geneva in May to discuss the Network ideas
- Recommendations were given for what to measure where for the follow-up on progress

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- For the ”Network” part it was recommended that UNEP
  - Initially forms a network between the major data holders
  - This restricted Netwok could at a later stage be extended
  - Build a web site with links to relevant monitoring information sources on the Internet
  - Take initiatives for the arrangement of an ”International Monitoring Conference”

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Possibilities in the ”Network”

- Informal discussion forum for users (primary and secondary, inluding modellers) and producers of data describing chemicals in the environment
- Descriptions of existing data bases and how data from those can be retrieved
- Descriptions of ongoing and planned activities

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- Discussions on data formats, both for communication and storage
- Description of ”grey” reports, with at least an abstract made available
- Announcements of available new certified reference materials, standards and upcoming intercalibrations
- Descriptions of models and their validation status
- Discussions on data quality indicators

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Parallel activities

- Canada, Mexico and USA has to coordinate their work on chemiclas within the NAFTA framework
- Japan is taking an initiative to build a corresponding network in East Asia

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Present status of the Network project

- A six months ”preparatory phase” has now been finished
- A two year ”pilot phase” will start this fall
- If the ”pilot phase” is successful a long-term programme will be established

Possible Nordic/European inputs to the Network

- All the Nordic countries are members of EEA, and a support to possible initiatives from this organisation is probably more effective than actions of individual member states
- Unfortunately, EEA has a limited capacity regarding work with chemicals, but the situation may improve as a number of new countries naw are going to join

NSDB - A Nordic database for priority setting of hazardous chemicals.

Bert-Ove Lund, KemI, Sweden

Introduction

In 1997 the Nordic Chemicals Group, a working group under the Nordic Council of Ministers, initiated a joint Nordic project ”Criteria for Selecting OSPAR Substances”. Under this project a database, The Nordic Substance Database (NSDB), and a selection procedure has been developed. The idea behind the project was to develop a tool making it possible via an automatic selection procedure, to identify substances fulfilling given sets of criteria based on information on intrinsic properties of the substances (persistancy, toxicity and liability to accumulate), and to try out the effect of choosing different cut off values for these parameters. When developing the database the aim should be to include information on an as wide range of chemicals as possible.

The Database

The Nordic Substance Data Base (NSDB) includes data from a Swedish project (Selecting multiproblem chemicals for Risk reduction) and it is further supplemented with information from several other data sources. Information from more than 30 important data sources has so far been incorporated in NSDB. The database contains some kind of information on about 18,000 substances or groups of substances, while experimental data on one or more parameters are included for more than 11,000 substances. The basis for the data is laboratory tests, however, for bioaccumulation both measured and modelled data are included in the database. The database also provides certain supplementary information on a substance, such as physical/chemical properties, whether it is registered in the Nordic Product Registers etc.. Reference to the different sources for the data in NSDB is stored in the database.

The structure of the database makes it possible to include modelled data for degradation and toxicity as well, but no such data are included in the present version of NSDB.

As only limited evaluation of data quality has been performed before including available data in the database, this has to be performed after each automatic selection as a separate manual step.

Pre-treatment of data

The original data in the different sources are given in different units, and both numeric and non-numeric information occurs. Each entry has therefore been scaled and transformed to a value between 1 and 10. This procedure makes comparison and selection of substances based on data of various kinds, including non-numerical information, possible. The applied scaling rules are stored in the database.

Selection procedure

When a combination of parameters and cut-off values has been identified (scaled values) the selection can be tried out in the database. Two main selection procedures (queries) can be applied in the database. The selection procedure can either be based on a search using cut-off values for the main categories of intrinsic properties, biodegradation, toxicity (mammalian and/or aquatic) and liability to accumulate, or for the individual parameters as ready biodegradability and/or inherent biodegradability and/or half life, BCF and/or log K, acute and/or chronic toxicity for fish and/or daphnia and/or algae, carcinogenicity, mutagenicity etc.. The latter search provides the possibility to specify in greater detail which parameters shall be included and to differentiate the cut-off values in greater detail.

Preference is always given to the most stringent value registered for each parameter when a selection is tried out in NSDB. This implies that the initial selection step always has to be followed by an expert judgement to evaluate the quality and relevance of the underlying data. This is facilitated by the fact that for every selection of substances that is made based on scaled values, the total basis for the selection, i.e. the original data stored in the database, together with information on which source the different data originate from can be identified for every selected substance. Thus making it possible to track the original data for further evaluation of their relevance and quality.

NSDB also provides effective search procedures to identify all available information in the database on single CAS numbers or a list of CAS numbers.

Distribution of the database
NSDB is now distributed as a CD-rom version to Contracting Parties in OSPAR and NGOs participating in the Dynamec process. However, it is not to be regarded as a final product as work on further development and refinement of the database will continue. As additional data become available they will be included in the database.

All the Nordic countries have participated in the steering group for the joint Nordic project.

Contactperson for the project
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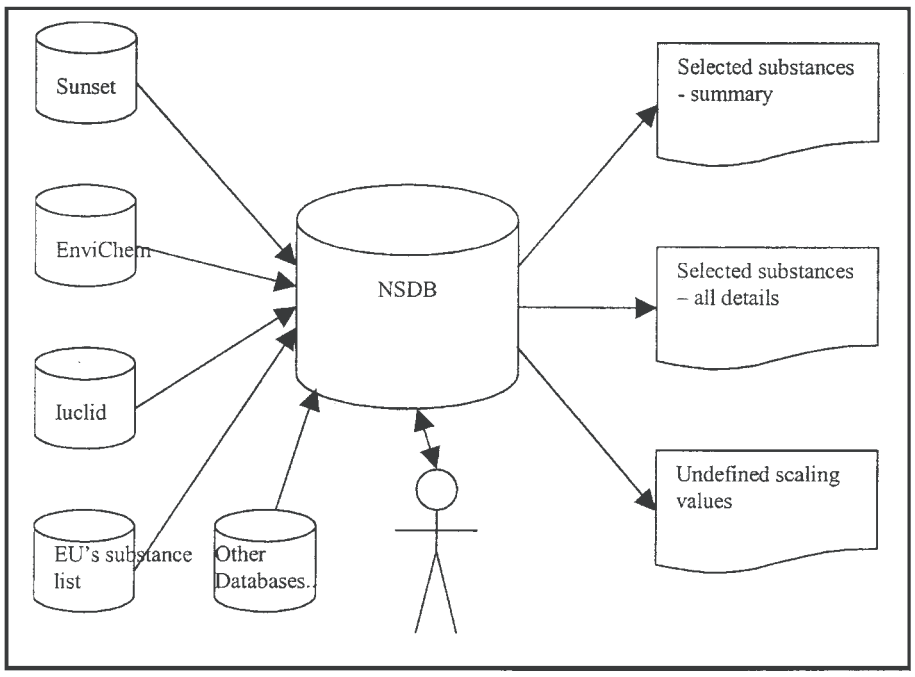
Appendix 6
(B-O Lund: Slides)

NSDB - A nordic database for priority setting of hazardous chemicals

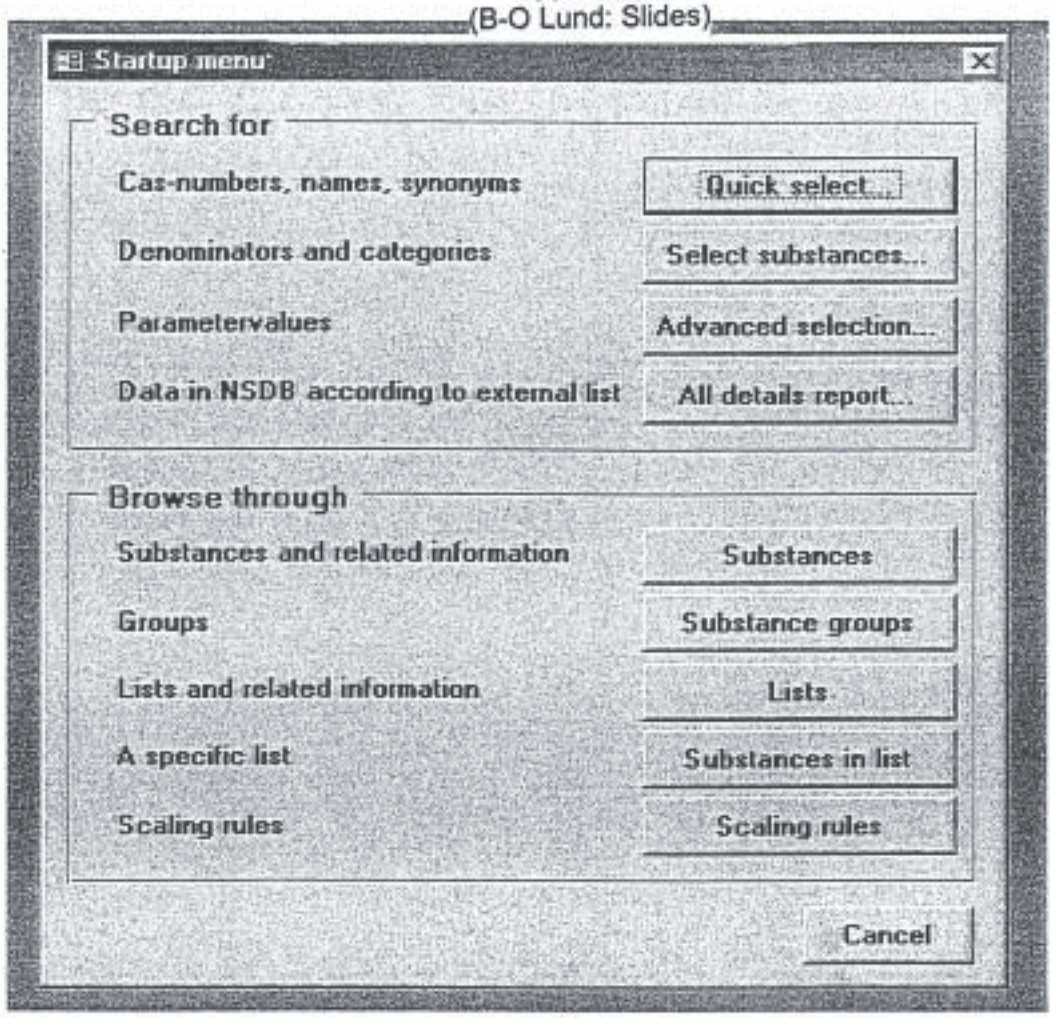
Bert-Ove Lund

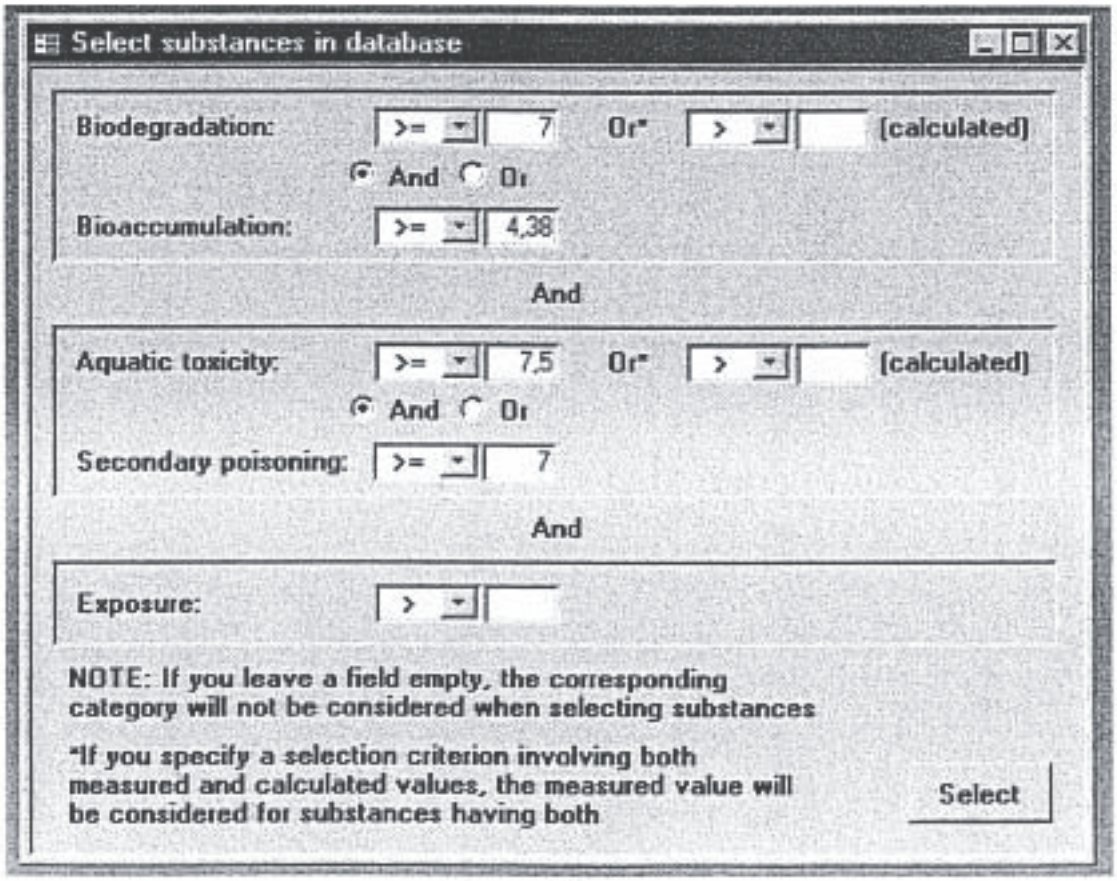
National Chemicals Inspectorate, Sweden

e-mail: bertovel@kemi.se



Appendix 6
(B-O Lund: Slides)





Selected substances - summary

Selection criterion: ((BioDeg > 8 And BioAcc > 8) And (AquaTox > 8 And SecPois > 8))

			Denominator						
CasNumber	**Name**	**Group(s)**	**BioDeg**	**BioAcc**	**SecPois**	**AquaTox**	**Expos**	**BioDegCalc**	**AquaToxCalc**
56-55-3	Benz[a]anthracene	130498-29-2	9	8,75	9	9,17			
60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxir	-209	9	8,75	9	9,17			
71-43-2	Benzene	8006-61-9	9	8,75	9	9,17			
		8030-30-6							
		63231-51-6							
		64741-46-4							
		64741-55-5							
		106602-80-6							
72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxir	-209	9	8,75	9	9,17			
75-74-1	Plumbane, tetramethyl-	-1377	9	8,75	9	9,17			
		-359							
76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,		9	8,75	9	9,17			
118-74-1	Benzene, hexachloro-	68411-45-0	9	8,75	9	9,17			
207-08-9	Benzo[k]fluoranthene	130498-29-2	9	8,75	9	9,17			
309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,	-209	9	8,75	9	9,17			
1336-36-3	1,1'-Biphenyl, chlorinated	-118	9	8,75	9	9,17			
1746-01-6	Dibenzo(b,e)(1,4)dioxin, 2,3,7,8-tetr	41903-57-5	9	8,75	9	9,17			
2104-64-5	Phosphonothioic acid, phenyl-, O-et		9	8,75	9	9,17			
8001-35-2	Toxaphene		9	8,75	9	9,17			
90640-86-1	Distillates, coal tar, heavy oils		9	8,75	9	9,17			
91465-08-6	Cyclopropanecarboxylic acid, 3-(2-c		9	9	9	9,17			
91995-15-2	Anthracene oil, anthracene paste, ant		9	8,75	9	9,17			

Appendix 6
(B-O Lund: Slides)

Selected substances - all details

Selection criterion: ((BioDeg > 8 And BioAcc > 8) And CasNumber = 87832)

			Denominator						
CasNumber	**Name**	**Group(s)**	**BioDeg**	**BioAcc**	**SecPois**	**AquaTox**	**Expos**	**BioDegCalc**	**AquaToxCalc**
87-83-2	Benzene, pentabromomethyl-	-170 -115	9	8,75		7,5			

Original information on biodegradeability:

List ID	List name	Conv value	Ready	Scale	Reference
E1A	MITI 1992	7	7	9	Biodegradation and bioaccumulation data of existing chemicals based on the CSCL Japan. Ed. by
List ID	**List name**	**Conv value**	**Inherent**	**Scale**	**Reference**
EC_Degradation	Envichem, biodegradation dat	7	Biodegradation:	9	Finnish Environment Institute, Chemicals Division, P.O. Box 140, 00251 Helsinki

Original information on bioaccumulation:

List ID	List name	Conv value	BCF	Scale	Reference
qsar	QSAR physicochem data	47863,01	4,68	8,75	Danish EPA, Strandgade 29, DK-1401 København K
EC_Metabolism	Envichem, bioaccumulation da	39	9, 6w, Cyprinus carpio,	1,25	Finnish Environment Institute, Chemicals Division, P.O. Box 140, 00251 Helsinki
E1A	MITI 1992	39	39	1,25	Biodegradation and bioaccumulation data of existing chemicals based on the CSCL Japan. Ed. by
List ID	**List name**	**Conv value**	**Log KOW**	**Scale**	**Reference**
qsar	QSAR physicochem data	6,99	6,99	9	Danish EPA, Strandgade 29, DK-1401 København K
EC_Physicochemical	Envichem, physicochem data	5,43	5.43 MITI 1992	7	Finnish Environment Institute, Chemicals Division, P.O. Box 140, 00251 Helsinki
E1A	MITI 1992	5,43	5,43	7	Biodegradation and bioaccumulation data of existing chemicals based on the CSCL Japan. Ed. by

Original information on secondary poisoning:

Original information on aquatic toxicity:

List ID	List name	Conv value	Acute fish	Scale	Reference
EC_ Aquatic	Envichem, aquatox data	5	5	5,83	Finnish Environment Institute, Chemicals Division, P.O. Box 140, 00251 Helsinki
E1A	MITI 1992	5	5	5,83	Biodegradation and bioaccumulation data of existing chemicals based on the CSCL Japan. Ed. by

List ID	List name	Conv value	Acute alge	Scale	Reference
aquire1_2	Data from Aquire 1994	1	1000	7,5	Aquire, US Environmental Protection Agency, Homepage: http://www.epa.gov/med/databases/aqui

Original information on exposure:

List ID	List name	Conv value		Water solubl	Scale	Reference
qsar	QSAR physicochem data	0,0009		0,0009		Danish EPA, Strandgade 29, DK-1401 København K
EC_Physicochemical	Envichem, physicochem data	2	2	<2, MITI 1992		Finnish Environment Institute, Chemicals Division, P.O. Box 140, 00251 Helsinki

List ID	List name	Conv value	Molecule wei	Scale	Reference
qsar	QSAR physicochem data	486,62	486,62		Danish EPA, Strandgade 29, DK-1401 København K

List ID	List name	Conv value	Vapour press	Scale	Reference
qsar	QSAR physicochem data	0	0		Danish EPA, Strandgade 29, DK-1401 København K

Original information on calculated biodegradation:

Original information on calculated aquatic toxicity:

Appendix 6
(B-O Lund: Slides)

Number of substances: 1

Abbreviations:
BioDeg - Biodegradation
BioAcc(Calc) - Bioaccumulation (calculated)
SecPois - Secondary poisoning
AquaTox(Calc) - Aquatic toxicity (calculated)
Expos - Exposure

Property	No. of substances in NSDB with data
Biodegradation	about 2,300
Aquatic toxicity (acute and chronic)	about 4,550
Mammalian toxicity (acute and chronic)	about 4,800
Bioaccumulation	about 8,400

Selection	Applied cut-off values
I	P: Not inherently biodegradable **and** B: log K_{ow} > =5 or BCF > =5000 **and** T_{aq}: acute L(E)C_{50} = <0.1 mg/l, long-term NOEC = <0.01 mg/l **or** $T_{mammalian}$: CMR or chronic toxicity
II	P: Not inherently biodegradable **and** B: log K_{ow} > =5 or BCF > =5000 **and** T_{aq}: acute L(E)C_{50} = <1 mg/l, long-term NOEC = <0.1 mg/l **or** $T_{mammalian}$: CMR or chronic toxicity
III	P: Not inherently biodegradable **and** B: log K_{ow} > =4 or BCF > =500 **and** T_{aq}: acute L(E)C_{50} = <1 mg/l, long-term NOEC = < 0.1 mg/l **or** $T_{mammalian}$: CMR or chronic toxicity
IV	P: Not readily biodegradable **and** B: log K_{ow} > =5 or BCF > =5000 **and** T_{aq}: acute L(E)C_{50} = <1 mg/l, long-term NOEC = <0.1 mg/l **or** $T_{mammalian}$: CMR or chronic toxicity
V	P: Not readily biodegradable **and** B: log K_{ow} > =4 or BCF > =500 **and** T_{aq}: acute L(E)C_{50} = <1 mg/l, long-term NOEC = <0.1 mg/l **or** $T_{mammalian}$: CMR or chronic toxicity

Table 1 shows the number of substances selected by each set of criteria and the number of those which are included in EINECS, the Nordic Products Registers and are on the list of high and medium production volume chemicals in the EU[2].

Table 1

Selection	I	II	III	IV	V
Total	59	69	144	80	171
EINECS	56	65	134	76	160
Nordic Product Registers	26	30	71	38	87
HPV	26	29	73	36	85
MPV	7	10	20	11	26

Substances selected by the Danish QSAR database as the number of substances in EINECS, Nordic Product Registers and in high and medium production volumes.

Selection	I	II	III	IV	V
Total	122	343	497	615	1046
EINECS	122	343	497	615	1046
Nordic Products	9	22	29	35	56
HPV	3	5	6	5	12
MPV	9	31	42	58	94

2 HPV > 1000 t/y per manufacturer. MPV > 10 t/y and < 1000 t/y per manufacturer. List of MPV received by ECB by 4 Feb. 1999; still under revision.

Appendix 6
(B-O Lund: Slides)

Group I – PTB category I and indication of use or exposure

CAS No	Name	IUPAC name
732-26-3	**decyl phenol**	**phenol, 2,4,6-tris(1,1-dimethylethyl)-** EU Dir 91/414 but not on a priority list
115-32-2	**dicofol**	**benzenemethanol, 4-choro-alpha.-(trichloromethyl)-** EU Dir 91/414 first list and EU draft Water Framework Directive first priority list
115-29-7	**endosulphan**	**6,9-methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-** EU Dir 91/414 second list
72-43-5	methoxychor	benzene,1,1,-(2,2,2-trichoroethylidene)bis(4-methoxy EU draft Water Framework Directive first priority list
140-66-9	octylphenol	phenol, 4-(1,1,3,3,tetramethylbutyl)-

Group I* – PTB category I and indication of use or exposure, some data gaps, uncertainty regarding underlying data

CAS No	Name	IUPAC name
85-22-3		**benzene, pentabromoethyl**
2104-64-5	EPN	phosphonothioic acid, phenyl-, O-ethyl O-(4-nitr...
2227-13-6	tetrasul	benzene, 1,2,4-trichloro-5-[(4-chlorophenyl)thio]-
22832-87-7	miconazole nitrate	1-H-imidazole, 1-(2-(2,4dichlorophenyl)-2-((2,4...
51000-52-3		**neodecanoic acid,ethenyl ester**
335-57-9		**heptane, hexadecafluoro-**
355-43-1		**hexane,1,1,1,2,2,3,3,4,4,5,5,6,6-tridecafluoro-6-iodo**
512-04-9	**diosgenin**	**spirost-5-en-ol,(3beta, 25R)-**
4904-61-4		1,5,9-cyclododecatriene
55525-54-7		**urea,N,N-bis[(5-isocyanato-1,3,3-rimethylcyclohexyl).**
59447-55-1		**2-propenoic acid, (pentabromophenyl) methyl ester** EU Dir 91/414 but not on a priority list and EU draft Water Framework Directive first priority list
1582-09-8	trifluralin	benzeneamine, 2,6-dinitro-N,N-dipropyl-4-trifluoromet.. EU Dir 91/414 first priority list
23593-75-1	**clotrimazole**	**1H-imidazole, 1-[(2-chorophenyl)diphenylmethyl**

Appendix 6
(B-O Lund: Slides)

Group II – PTB category III/V and indication of use or exposure

CAS No	Name	IUPAC name
107-46-0	D6	disiloxane, hexamethyl
EU Reg 793/93 4th priority list		
77-47-4		**1,3-cycopentadiene, 1,2,3,4,5,5-hexachloro**
79-94-4	TBBA	phenol, 4,4′-(1-methylethylidene)bis[2,6-dibromo-
		EU Reg 793/93 earlier priority list and Draft Water Framework Directive first priority List
120-82-1	1,2,4-trichlorobenzene	benzene, 1,2,4-trichloro
		EU Draft Water Framework Directive first priority List
87-61-6	**trichlorobenzene**	**benzene, 1,2,3-trichoro**
108-70-3	1,3,5-trichlorobenzene	benzene, 1,3,5-trichloro
		OECD SIDS data gathering (Japan)
98-51-14-	**tert-butyltoluene**	**benzene, 1-(1,1-dimethylethyl)-4-methyl-**

Group II*– PTB category III/V and indication of use or exposure, some data gaps, uncertainty regarding underlying data

CAS No	Name	IUPAC name
294-62-2		cyclododecane
603-35-0		phosphine, triphenyl
90604-37-8		alcohols, C11-15-branched
97280-83-6	**isododecane**	**dodecane, branched**
		(German BUA report)
793-24-8	6PPD	1,4,benzenediamine, N-(1,3-dimethylbutyl)-N-phenyl
		EU dir 91/414 first priority list
3861-47-0	**loxynil octuroate**	**octanoic acid, 4-cyano-2,6-diiodophenyl ester**
		EU dir 91/414 first priority list and Draft Water Framework Directive first priority List
2921-88-2	chlorpyrifos	phosphorothioic acid, O,O, diethyl O-....

25. april 2001/SUB

NOVA 2003 - Principles for implementing new substances in the Danish water monitoring programme

By Susanne Boutrup, Environmental Monitoring Co-ordination Section, National Environmental Research Institute

The present Danish water-monitoring programme includes monitoring of many organic and inorganic substances. Many of these substances were not included in the previous programme, and for some of the substances there has been extensive problems to be able to do the laboratory analyses with the required analytical quality. It means that there still are a few substances in the programme, whish are not fully implemented.

The present programme is running until 2003. The programme will be revised before start of the following programme. In that connection it might be actual to include new substances or new monitoring fields, and in order to get the optimal benefit of the ressources used to generate and change the programme, some preliminary considerations and investigations must be done before the decision of implementing the changes - if they not already are done.

Preliminary considerations

- National and international studies of the occurence and effect on the environment of the substance has to be examined.
- Facts about the consumption in Denmark has to be collected before it can be concluded that the substance can be expected to be found in the Danish environment.
- It is necessary to consider if it is relevant at the same time to include other substances, for example metabolites or substances, which normally occur together with the main substance.
- It is necessary to consider which concentration level is relevant for the monitoring programme in order to meet the effect level, the legislation level and the expected level in the environment.

The preliminary investigations

- It must be defined in which matrices it is relevant to monitor the substance. The results from the preliminary considerations are used to make an assesment of where in the environment and how widespread the substance can be expected. The monitoring fields are defined by a screening of the matrices, where the substance at all can be expected to appear.
- The strategy for sampling must be defined. It must be considered if it is relevant to sample flow- or time-proportionate composites or subsamples pooled to one sample.
- The number of samples and the frequency of sampling must be defined be statistic considerations and investigations.

Analysis

- A documented methode which can detect the substance at the requested concentration level with a satisfactory analytical quality must be avaliable.
- The method must be tested.
- It must be defined how the laboratoires shall document the analytical quality.
- Laboratories must document their ability to perform the analysis at the requested leved and with the requested quality. Laboratories which meet these requests are approved to do the analysis in the monitoring programme.

sft: Notat

Til: NORDISK Råd & Ministerråd
v/Magnus Nyström
Fra: Harald Sørby
Dato: 02.05.2001

Statens forurensningstilsyn
Postboks 8100 Dep, 0032
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Besøksadresse: Strømsveien 96

Telefon: 22 57 34 00
Telefaks: 22 67 67 06

Til orientering:
Til uttalelse: Frist:
Til behandling: Frist:
Til godkjenning: Frist:
Retur: Frist:

Kopi til: Ola Glesne

Abstract

The European Pollutant Emission Register (EPER) is a key element of the European Directive on Integrated Pollution Prevention and Control (IPPC). EPER will provide information to the public on industrial emissions of 50 pollutants from about 20.000 individual facilities. Every three years member states are obliged to report to the Commission and the first report shall provide data on emissions in 2001 (optionally 2000 or 2002). The European Commission, assisted by the European Environment Agency (EEA) will make the facility specific data publicly accessible on the Internet.

The Norwegian system, INKOSYS (Industri Kontroll System), was introduced in 1978 as an internal tool for the authorities and upgraded in 1992. The upgrading included a reorganising of industrial reporting; annual reporting of all regulated chemicals, reporting of regulated production volumes and generated waste. The reporting of other relevant releases is a matter of good judgement by the individual facility. The need to meet user specifications as well as the growing public demand for easy access to environmental information implies a continuously updating and development of the system. For more information: www.sft.no\bmi
The introduction of Pollutant Release and Transfer Registers (PRTR) by the OECD and the ongoing co-operation on this subject (Århus Convention, Inter Forum of Chemical Safety (IFCS)) has given valuable input in the development of the Norwegian system.

Industrial reporting… … …

Sigtuna , 6-8 June 2001
Harald Sørby

Subjects

- European Pollutant Emission Register (EPER)
- The Norwegian INKOSYS (Industri Kontroll System)
- International activities
  - OECD (Pollutant Release and Transfer Register, PRTR)
  - Århus Convention (PRTR)
  - Inter Forum of Chemical Safety, IFCS
- Outlook

EPER

- IPPC Directive, (96/61/EC)

– Article 15 (3)
– "An inventory of the principal emissions and sources responsible shall be published every three years by the commission on the basis of data supplied by the Member States. The Commission shall … … ."

– Article 19
"The Commission shall be assisted by a committee of the representatives of the member states… … .."

s ft: Industrial reporting of releases of chemicals in Europe Sigtuna 6-8 June 2001

Commission Decision of 17 July 2000 (2000/479/EC)

– Who is reporting?

– Complex industrial areas!

– Chemicals to be reported

– Threshold values

– Reporting cycle

- Guidance Document

Who is reporting

Annex I activities (IPPC-directive)

–Production volumes/consumption exceeding threshold values

Identification of released substances

Releases exceeding threshold values

WHEN THEN… … … … ..

TO BE REPORTED

s ft: Industrial reporting of releases of chemicals in Europe Sigtuna 6-8 June 2001

Complex industrial areas

The majority of the reporting industries is rather straight forward.

For complex industrial areas there are examples provided in the guidance manual.

Chemicals to be reported

•Based on Annex III of the Directive, and existing lists/systems

–SEPA (Swedish EPA)
–CORINAIR
–SNAP
–EIONET
–others… … … ..

A list of 50 pollutants are selected for reporting to the Commission

s ft: Industrial reporting of releases of chemicals in Europe Sigtuna 6-8 June 2001

Threshold values

Threshold values set

–to cover the majority of the industrial releases

–To avoid reporting from minor contributors
(handling of to many reports)

Reporting cycle

Releases from 2001 (optional 2000 or 2002) to be reported by June 2003

Releases from 2004 to be reported by June 2006

From 2008 member states are encouraged to perform annual reporting
Releases from 2008 to be reported by December 2009

Reporting cycle to be reviewed

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Waste

Waste is not included in the reporting obligations.

Waste may become a part of the reporting at later revisions of the EPER.

INKOSYS

INdustri KOntroll SYStem

Started 1978
–Internal system for licensed industry and controlling activities

Reorganised 1992
–Still internal system

Information publicly available 2000

Major reorganisation 2002 ?

Continuously updating and refining of the system

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Licensed industry

Administrative information

Environmental information
- mandatory reporting
- specific conditions for releases/production volumes
- annual releases of substances/chemicals
- production volumes
- generated waste/transfer of waste

Information about
- recipient
- inspections/audits
- deviations from requirements

Selecting chemicals

•Releases of specifically regulated chemicals
–annual loads to be reported

•Any releases of concern (environmental impact)
–annual loads to be reported

GUIDING list of chemicals

NO threshold values (to be evaluated by the polluter)

s ft: Industrial reporting of releases of chemicals in Europe Sigtuna 6-8 June 2001

Data quality

The licensed industry has responsibility to report
–according to requirements
–any releases of concern

SFT do not set threshold values for reporting releases

SFT values the reported figures based on
–our knowledge of the industry
–reported production volumes
–figures reported the previous years

The public access to the information gives vital input to god data quality.

Public accessible information

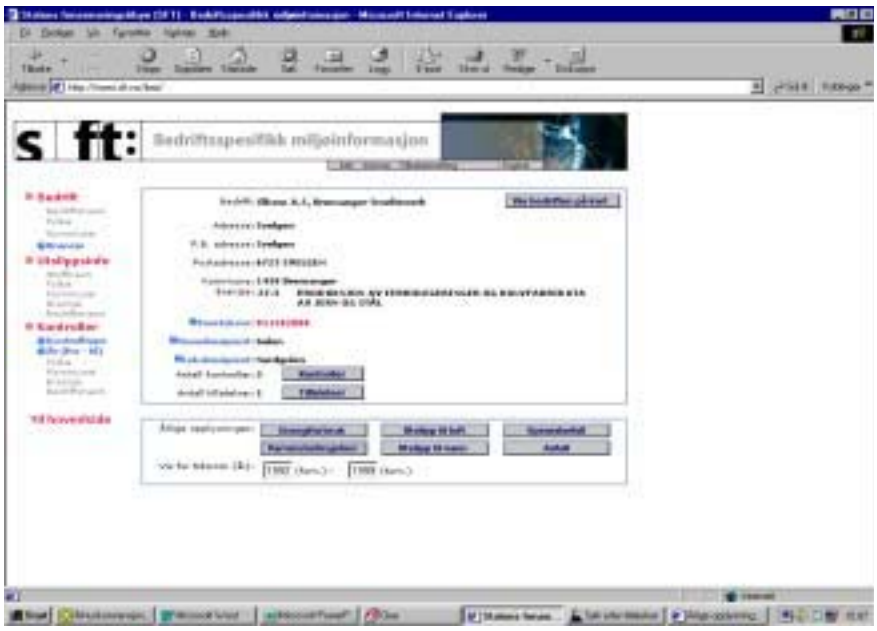
Information from INKOSYS is accessible via

www.sft.no\bmi

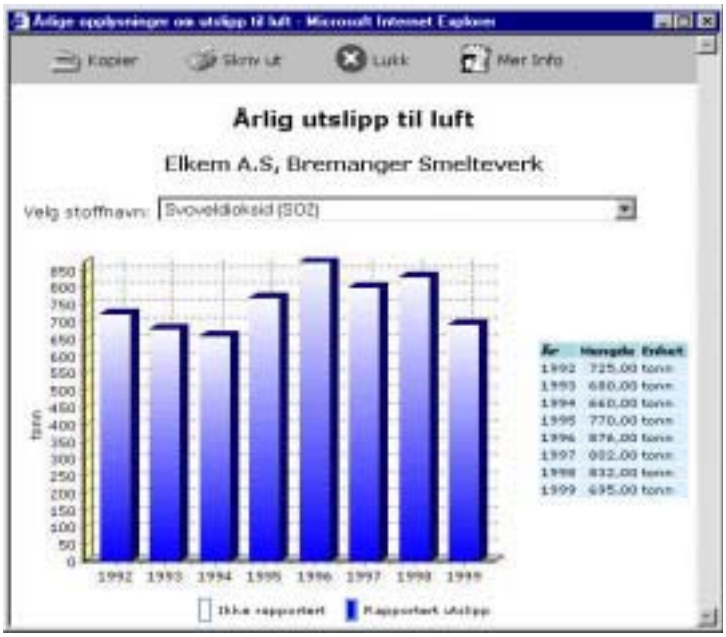
–production volumes and regulations
–releases to air end water
–energy consumption
–generated waste
–performed audits/inspections
–license (word-document)

to come:
–reports from audits/inspections (word-document)
–… … … … … ..

sft: Industrial reporting of releases of chemicals in Europe Sigtuna 6-8 June 2001




Årlig produksjonsvolum
Elkem A.S, Bremanger Smelteverk
Velg stoffnavn: Silgran
TONN
1992 1993 1994 1995 1996 1997 1998 1999
Ikke rapportert
Rapportert volum
Kommentar


Årlig utslipp til luft
Elkem A.S, Bremanger Smelteverk
Velg stoffnavn: Svoveldioksid (SO2)
tonn
1992 1993 1994 1995 1996 1997 1998 1999
Ikke rapportert
Rapportert utslipp

sft: Industrial reporting of releases of chemicals in Europe Sigtuna 6-8 June 2001

PRTR
Pollutant Release and Transfer Register

Agenda 21, UNCED Rio de Janeiro 1992
–Emission inventory programs (Chapter 19)

OECD
–OECD Pollution Prevention and Control Group started work on PRTR (1991)
–Guidance Manual for Governments (1996); as a follow up to Rio 92.

UNECE, Århus Convention
–PRTR being established

IFCS (Inter Forum of Chemical Safety)
–Review progress on Chapter 19 of Agenda 21
–PRTR as a subject to the Bahia Declaration
–PRTR action plan

Nordic co-operation on Emission Registers
–in the EPER process and other international fora
–more?

s ft: Industrial reporting of releases of chemicals in Europe Sigtuna 6-8 June 2001

Outlook

- Focus on hazardous chemicals
- The "right to know" principle
- Lessons learned… … .

Abstract for Workshop on Monitoring the Environmental Fate of Chemicals

SPIN

Increasing the availability of data from the Nordic Product Registers.

Poul Erik Andersen, Denmark
7 May 2001

In the Nordic Countries the need for data on chemicals has been met with the establishment of central product registers serving the authorities as information systems for chemical substances and preparations. National legislation requires manufacturers and importers to declare chemical substances and preparations to the product registers. Data in the registers include information on function, industrial category, hazard classification, composition, quantity etc. The registers are useful tools for the national authorities in efforts to prevent injury to health and environmental damage resulting from chemicals. Data in the registers are used as support for risk assessments carried out by the environmental authorities, statistical calculations, substance flow analyses and supervision activities.

Registration of chemicals with data on composition and volume of preparations and how and where they are used is an important way to get knowledge of downstream fate of the chemical substances, a knowledge that is not always available to the producers of these substances.

Last year, the Nordic Council of Ministers bye the Nordic Chemical Group established the Nordic Product Register Group (NPG). The main objective of NPG is to develop the product registers of the Nordic Countries to optimize the utilization of data from the registers, especially for the environmental protection authorities.

One of the problems with utilization of data in product registers is that the information on volume and composition of chemical preparations normally has to be kept confidential. But when a chemical substance is used in many different preparations for a specific purpose and/or within a certain industrial area it is often possible to publish aggregated information on the use of this substance. And if one of the registers according to this principle can disclose aggregated data on a specific use of a substance, the other registers will also be able to give qualitative information on this use of the substance, even if the data there are too sparse to make data aggregation on this substance.

With these considerations as basic principle the first task of NPG is to build a data base called SPIN (Substances in Products In the Nordic Countries). SPIN will contain data on the use of chemical substances based on aggregated data from the product registers in the Nordic Countries. Total volumes of each substance and number of preparations containing the substance will be distributed on use categories for product function and industrial area of use. If the substance is used in aerosols or preparations for private household, this will also be stated.

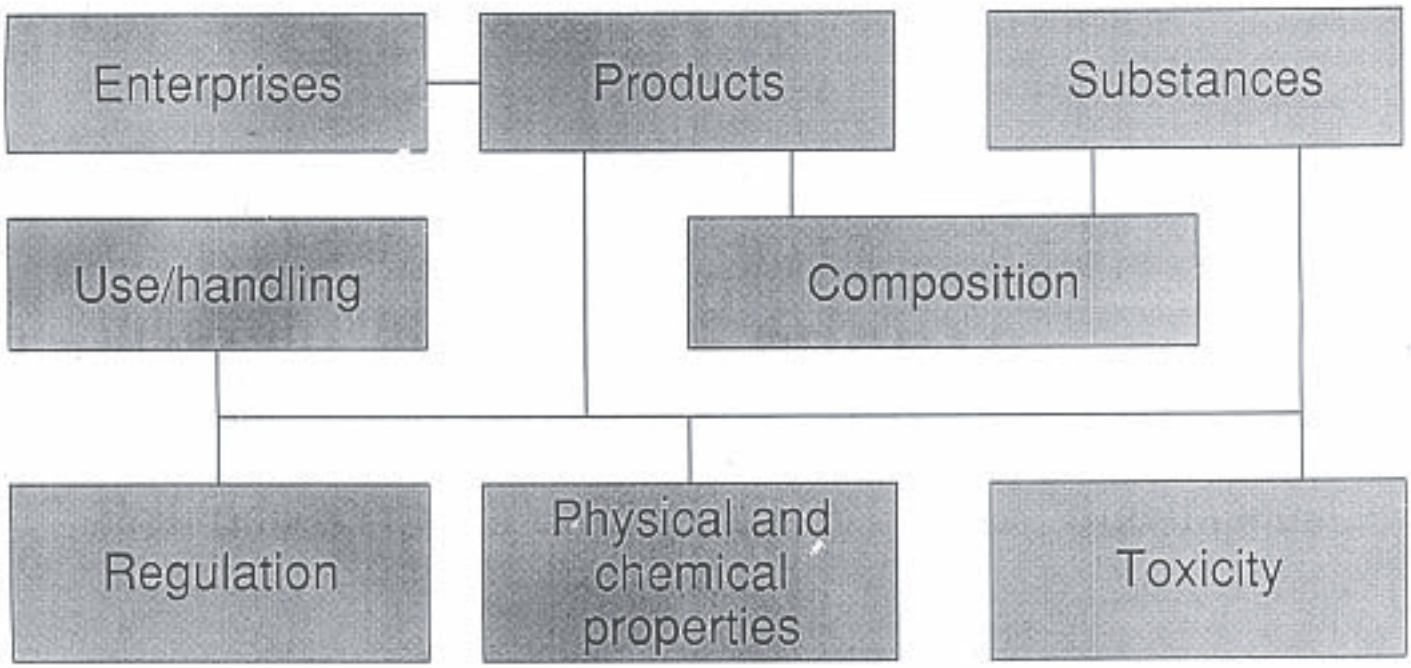
The use categories are individual product function categories from the different registers as well as harmonized categories for both product functions and industrial areas making comparison of data from the different countries possible.

The data base SPIN will at first be distributed to relevant authorities in the Nordic Countries. Once a year a new data set will be added making it possible to observe trends in the use of chemical substances. If the economical basis can be established it is also planned to make a version of SPIN available at the World Wide Web.

Appendix 9
(P E Andersen: Slides)

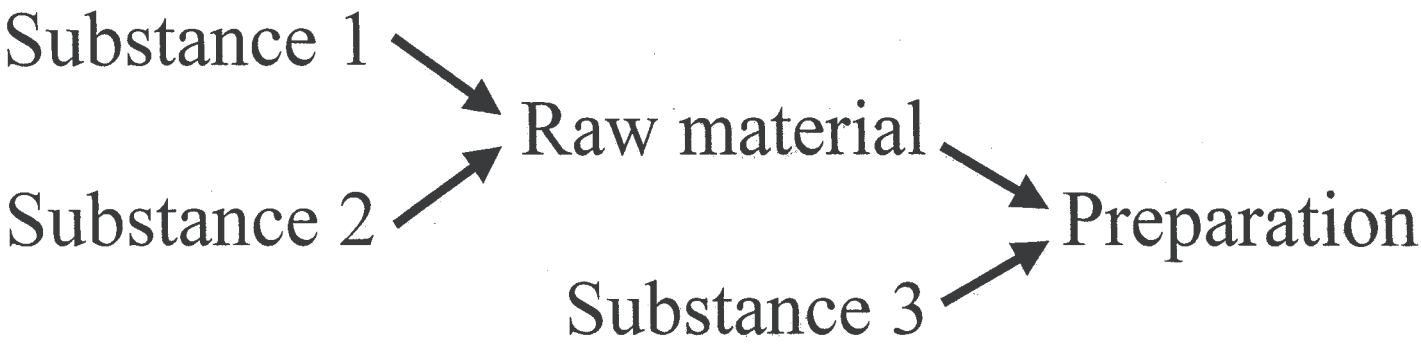
Fig. 1

Logical file structure in PROBAS

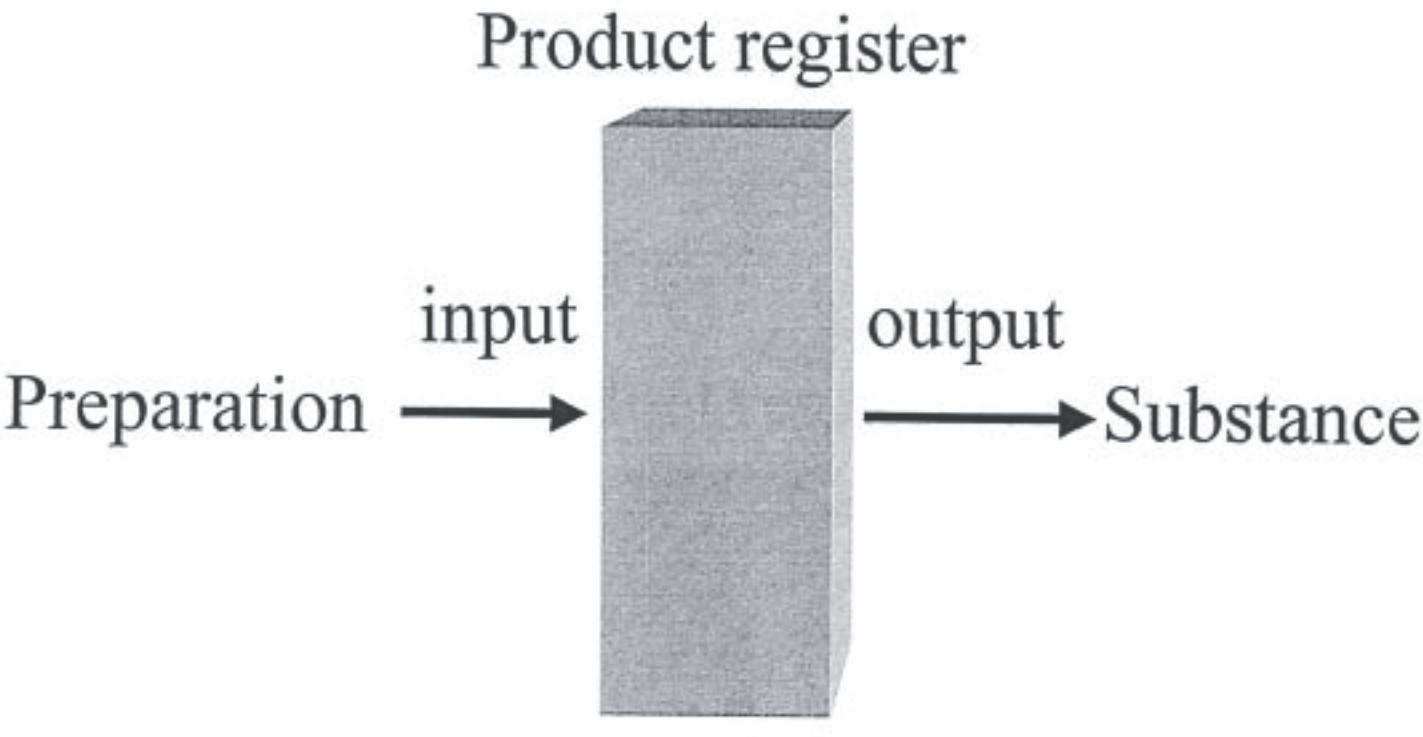


AMI

Appendix 9
(P E Andersen: Slides)



Appendix 9
(P E Andersen: Slides)



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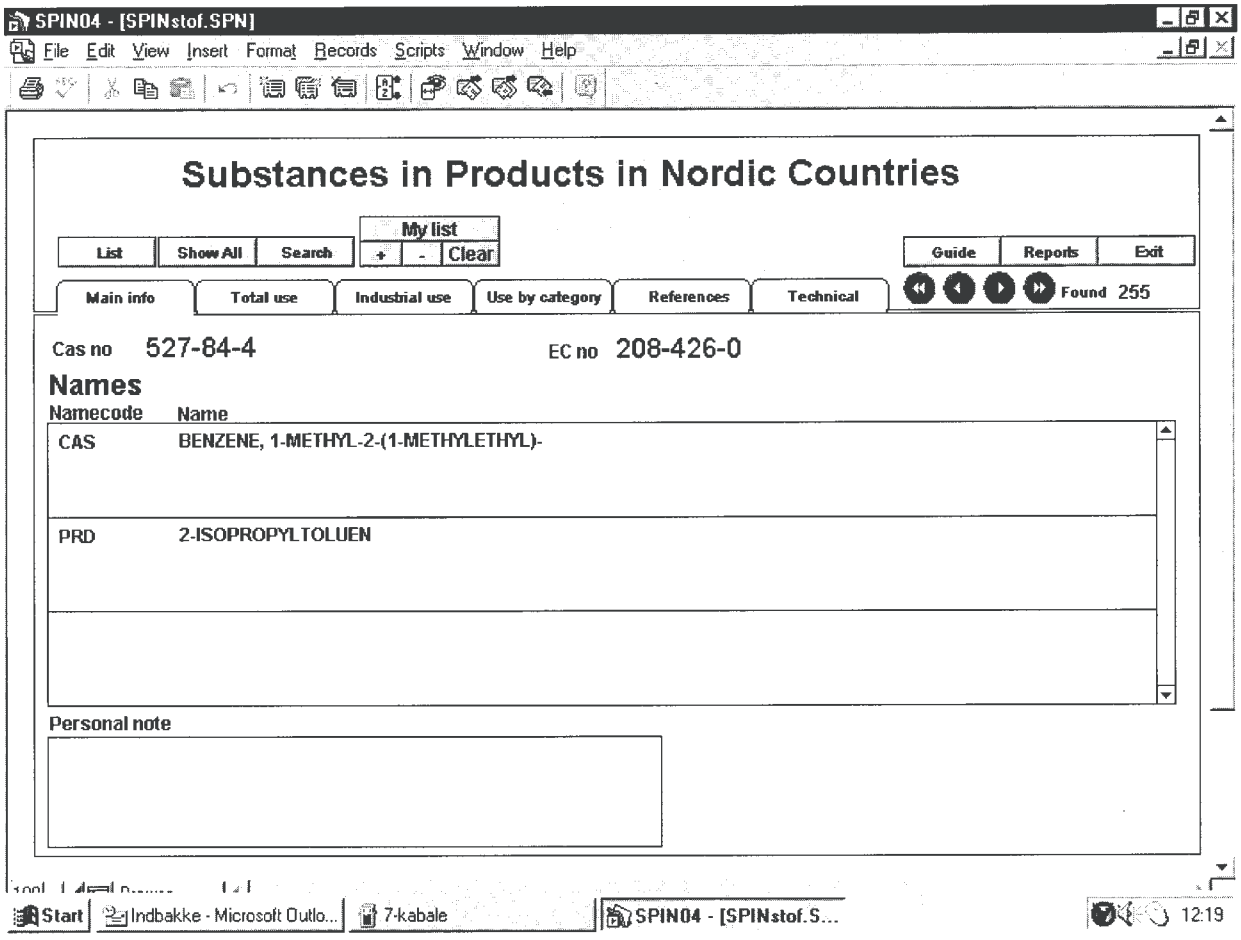
(P E Andersen: Slides)



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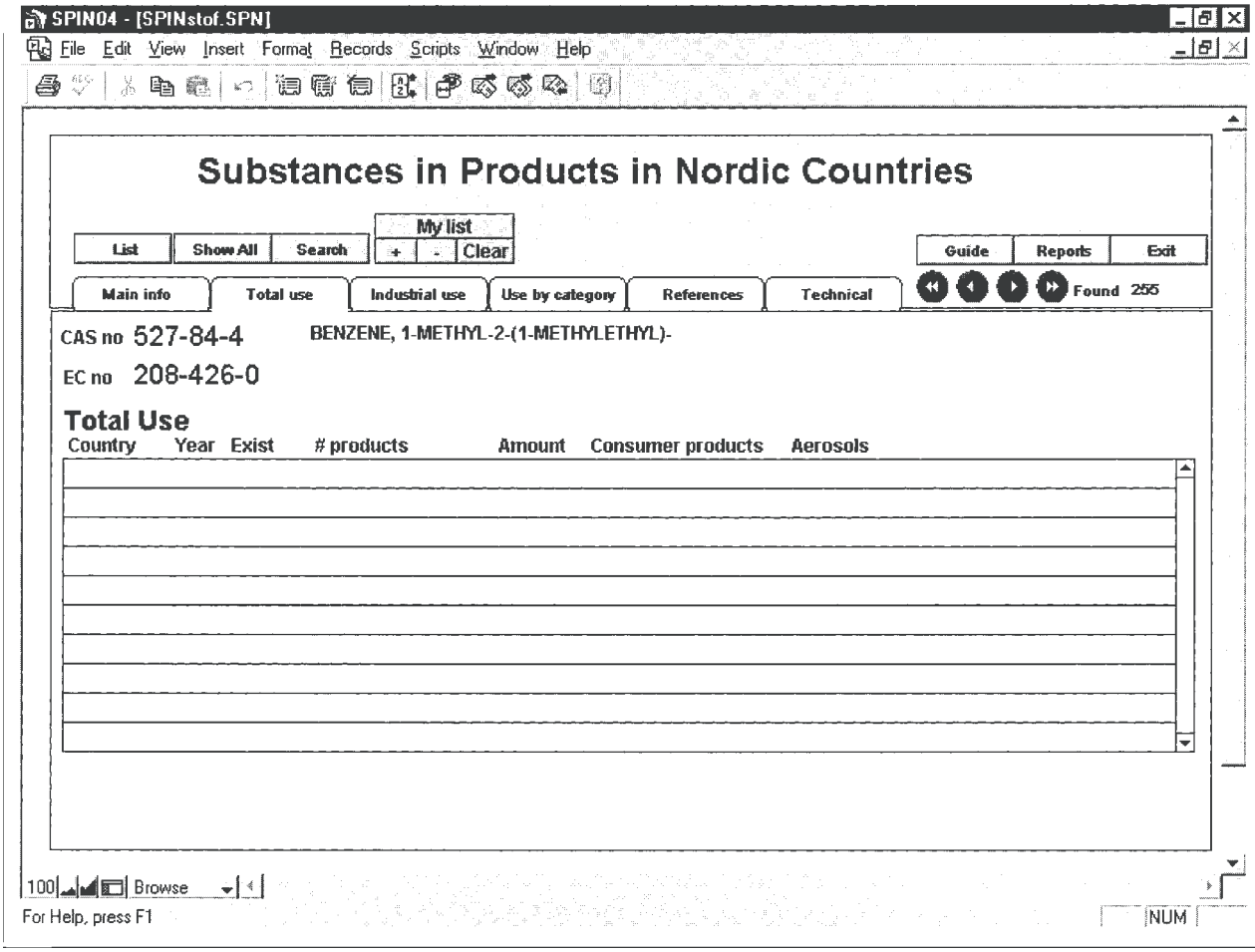
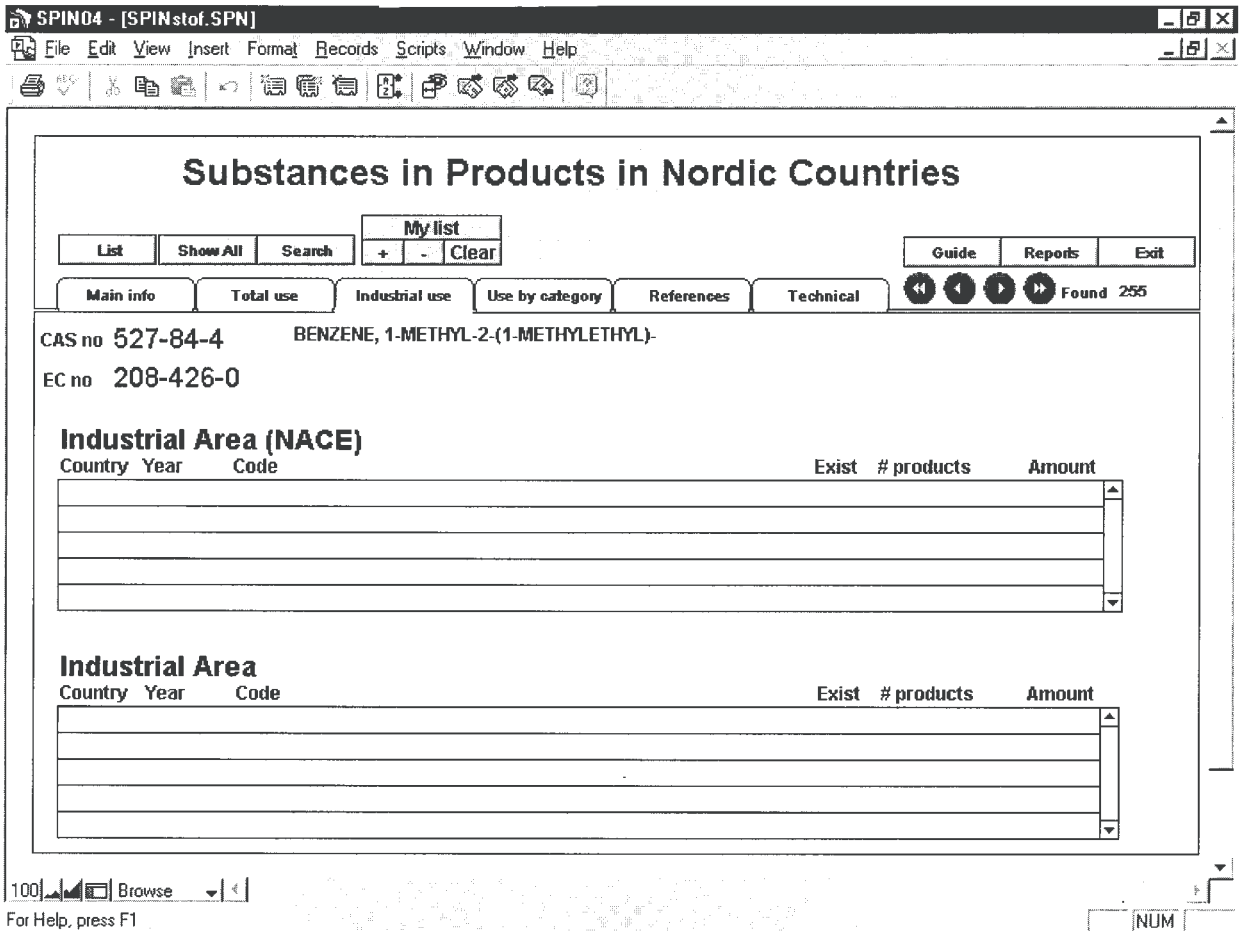
(P E Andersen: Slides)



Appendix 9
(P E Andersen: Slides)



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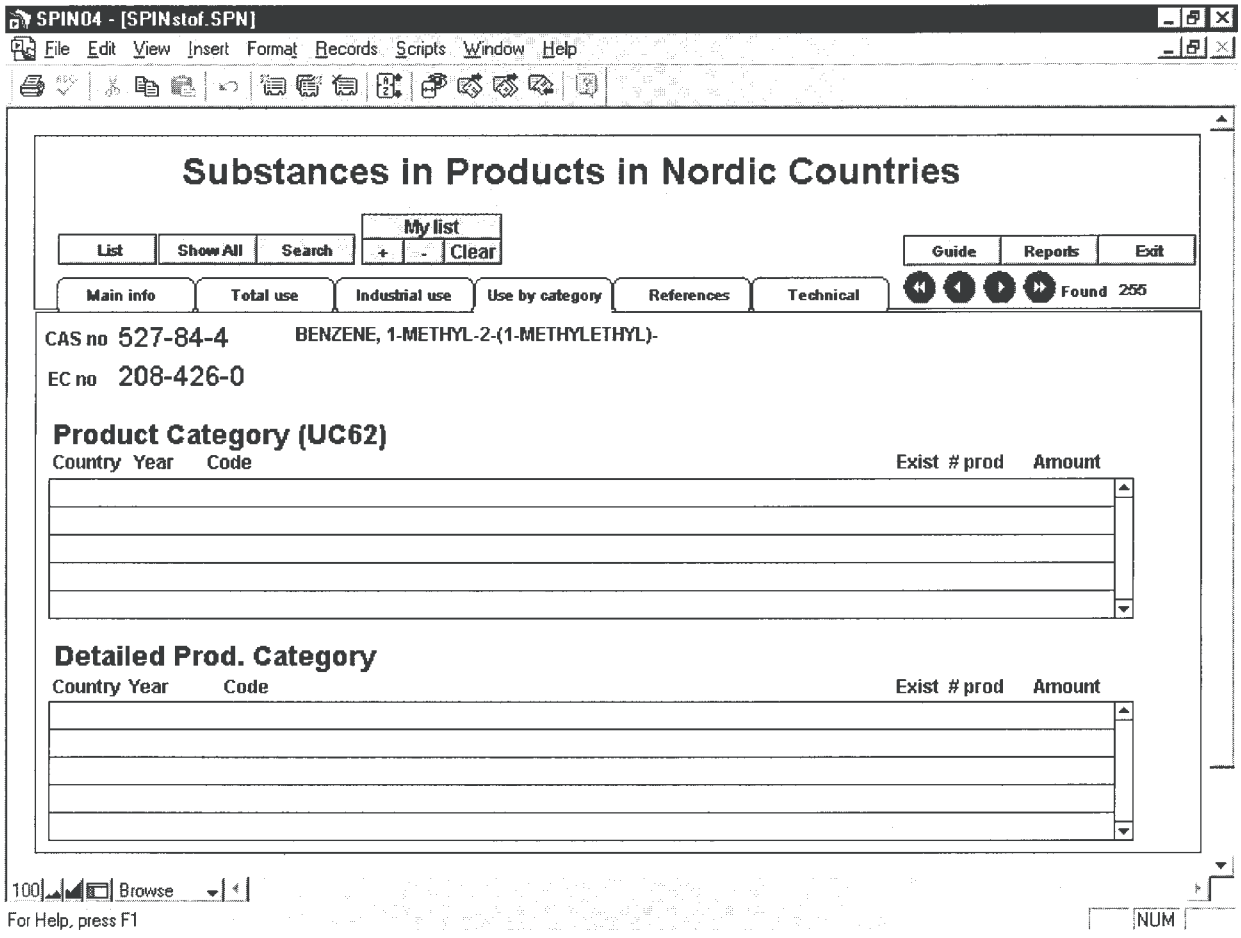
(P E Andersen: Slides)



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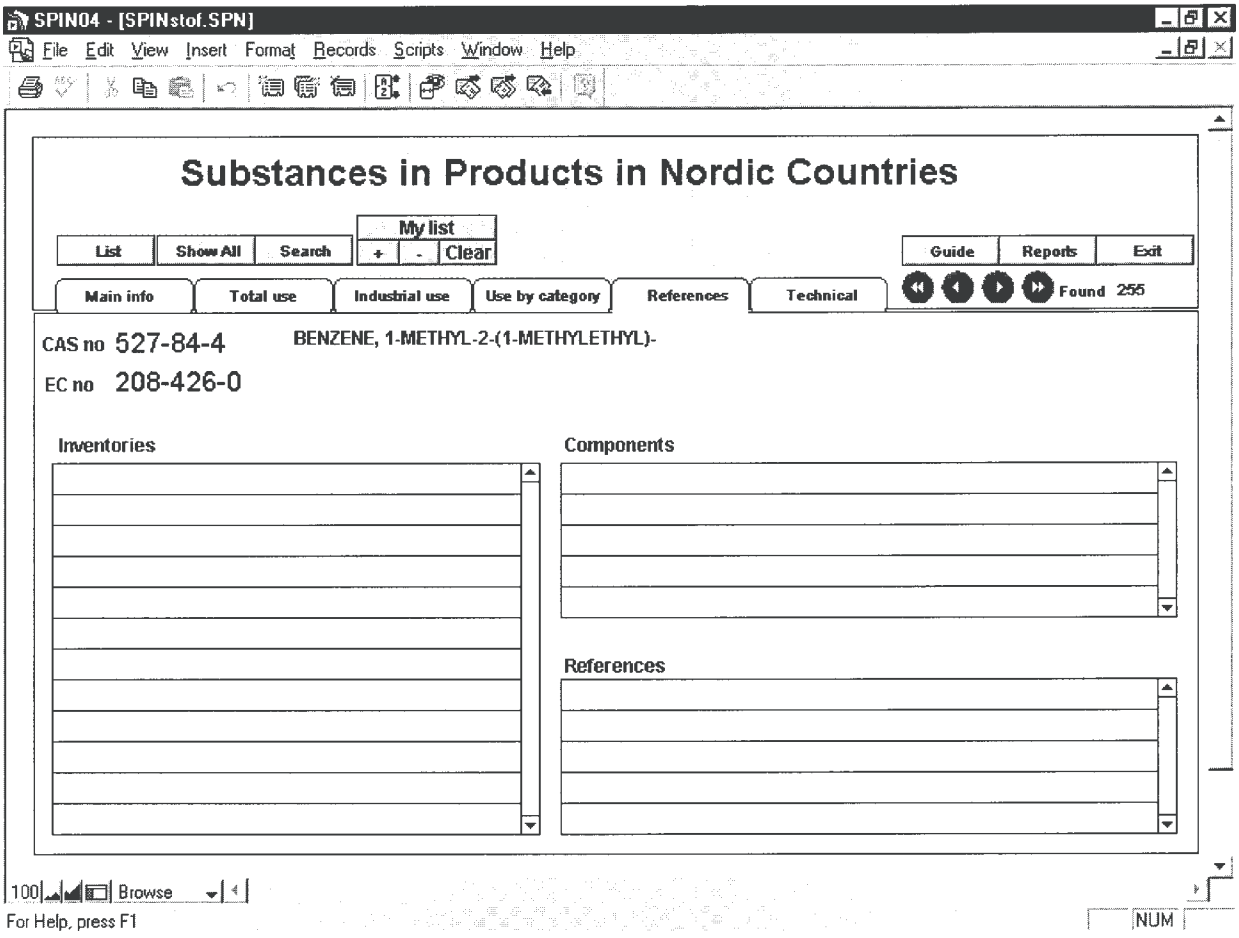

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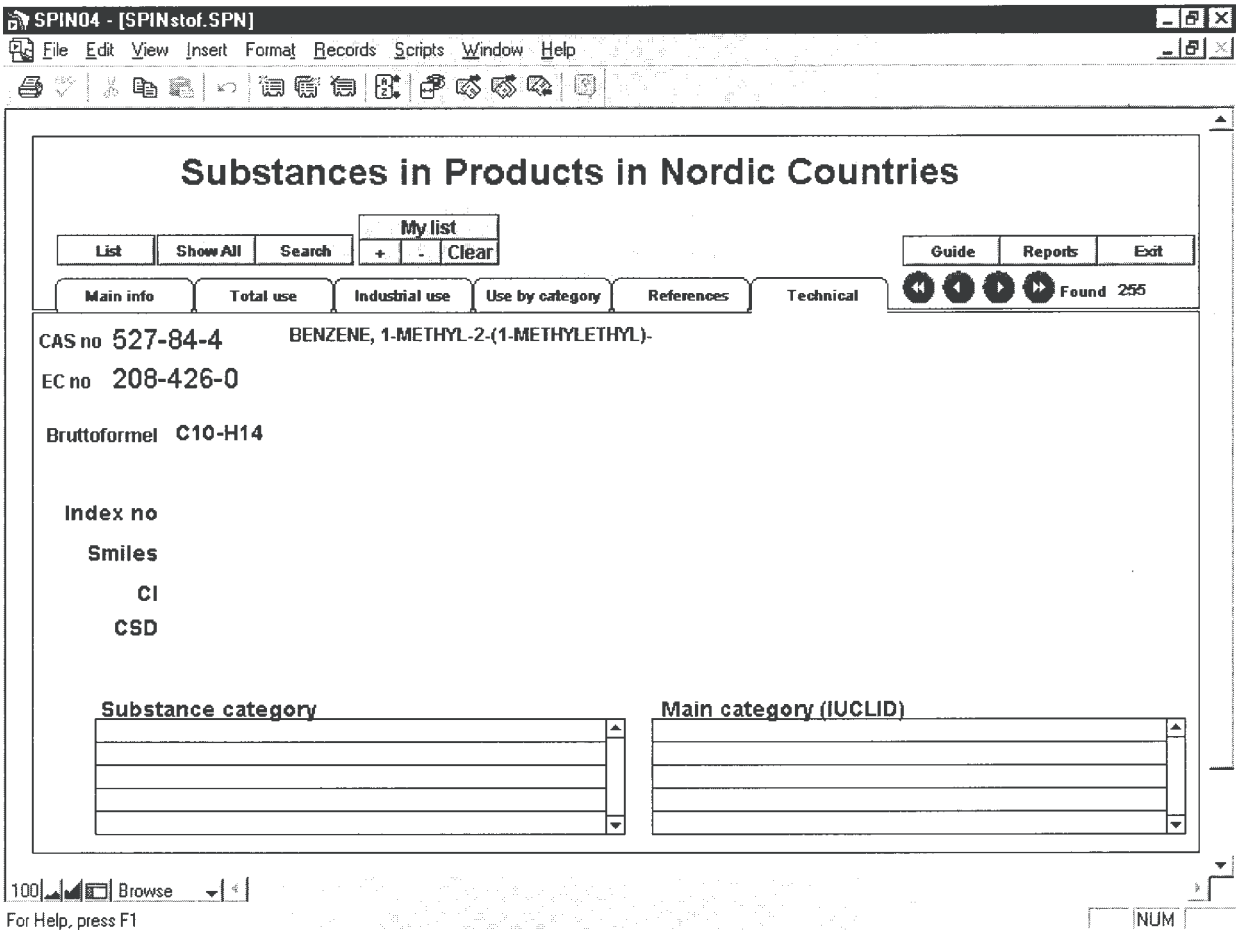


Appendix 10 (E.Brorström-Lundén: Abstract)

The HBCDD case: How to design a screening program

Eva Brorström-Lundén, John. Sternbeck, Mikael Remberger, Lennart Kaj, and Anna Palm

IVL, Swedish Environmental Research Institute

A screening study of hexabromocyclododecane (HBCDD) has been carried out in order to investigate the presence and concentration levels of HBCDD in the Swedish environment and to identify the most important emission sources. Up to now only a few measurements considering the occurrence of HBCDD in the Swedish ecosystem have been reported and data on emissions and concentrations of this compound is lacking.

HBCDD is used as a flame retardant mainly in polystyrene, and as coating polymer dispersion in textiles. The substance has been used commercially since the 1960s. A risk assessment of HBCDD is currently carried out within the EU-existing program for chemicals. HBCDD is not chemically bound in products and may therefore be released to the environment. It has physical and chemical properties like POPs (persistent organic pollutants) which means that it may be long range transported in the atmosphere, it is persistent in the environment and it may bioaccumulate in biota.

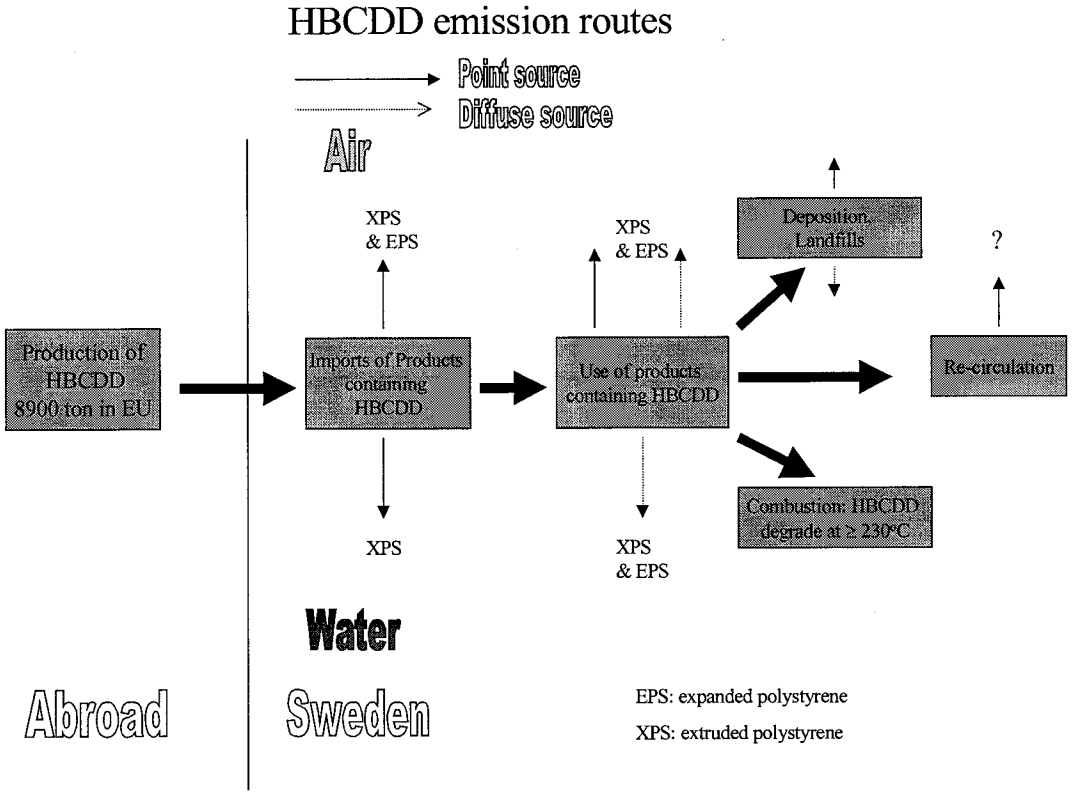
Information on emissions and concentration data of HBCDD is important both for estimations of environmental and human exposure as well as for the risk assessment of the substance.

The first part of this study was to investigate the possible sources of HBCDD, which is illustrated in figure 1.

A sampling strategy was designed according to the identified possible sources of HBCDD. The screening study was also aimed to get information about important pathways of HBCDD in the environment, e.g. atmospheric transport. The accumulation of HBCDD in different parts of the ecosystem as well as human exposure was also investigated.

HBCDD was measured in background areas and areas affected by diffuse pollution e.g. urban areas. The concentration of HBCDD was determined in air, precipitation, soil, sediment, municipal sludge, and fish. The human exposure was estimated by analysing different food samples.

The strategy of the screening study and the results will be presented. The screening was initiated and financed by the Swedish Environmental Protection Agency.


HBCDD emission routes
Point source
Diffuse source
Air
XPS
& EPS
XPS
& EPS
Deposition, Landfills
?
Production of HBCDD 8900 ton in EU
Imports of Products containing HBCDD
Use of products containing HBCDD
Re-circulation
Combustion: HBCDD degrade at > 230°C
XPS
XPS
& EPS
Water
Abroad
Sweden
EPS: expanded polystyrene
XPS: extruded polystyrene

Sigtuna 6-8 June 2001

The HBCD case: How to design a screening program

Eva Brorström-Lundén, John Sternbeck, Mikael Remberger, Lennart Kaj and Anna Palm

IVL, Swedish Environmental Research Institute

HBCD in Sweden:

A screening of a brominated flame retardant

2000-2001

Aim

- **identify the most important emission sources**
- **investigate the presence and concentration levels of HBCD in the Swedish environment**

Up to now only a few measurements considering the occurrence of HBCD in the Swedish ecosystem have been reported and data on emissions and concentrations of this compound is lacking

Background information

- **Properties of HBCD**

  Chemical-physical

- **Identify the possible sources of HBCD**

  Point sources

  Diffuse sources

  Usage in products

- **Previous environmental investigations**

  Concentrations in the environment

Sigtuna 6-8 June 2001

HBCD was measured at point sources in background areas and areas affected by diffuse pollution e.g. urban areas

The concentration was determined in different environmental media

- Air,
- Precipitation
- Soil,
- Sediment,
- Biota
- Municipal sludge,
- Different food samples.

The HBCD-Case

A sampling strategy was designed according to identified possible sources of HBCD.

The screening study of HBCD should give information on

Emissions and concentrations

Important pathways in the environment e.g. atmospheric transport.

Seasonal variation and geographical distribution

The accumulation in the ecosystem

The human exposure

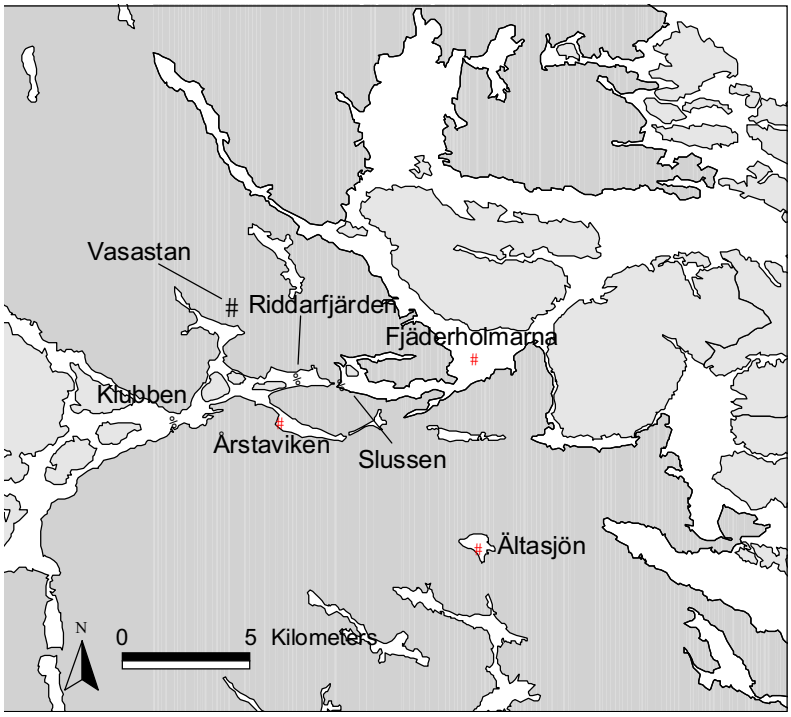
The data should be useful for verification of models (fugacity) and MFA and for risk assessment

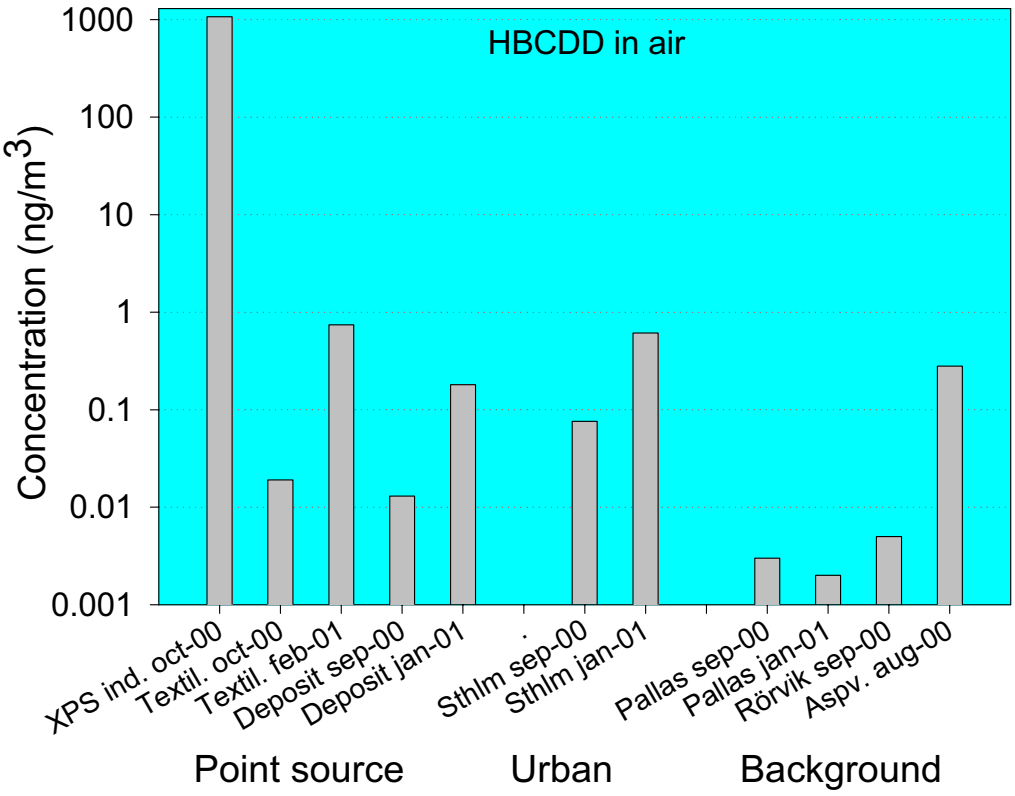
HBCD-facts

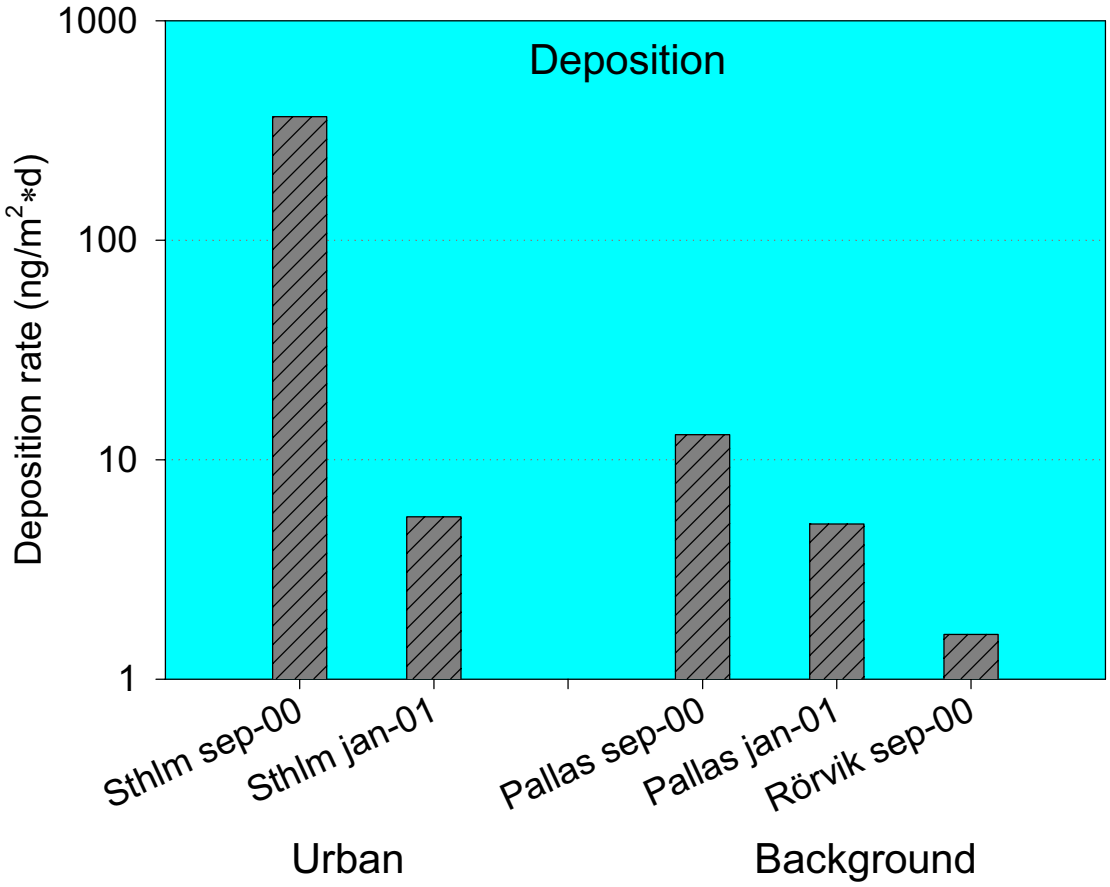
- HBCD is used as a flame retardant mainly in polystyrene, and as coating polymer dispersion in textiles
- The substance has been used commercially since the 1960s.
- HBCD is not produced in Sweden
- HBCD is not chemically bound in products and may therefore be released to the environment.
- It has physical and chemical properties like POPs which means that it may be long range transported in the atmosphere, it is persistent in the environment and it may bioaccumulate in biota.
- Risk assessment of HBCD is currently carried out within the EU-existing program for chemicals

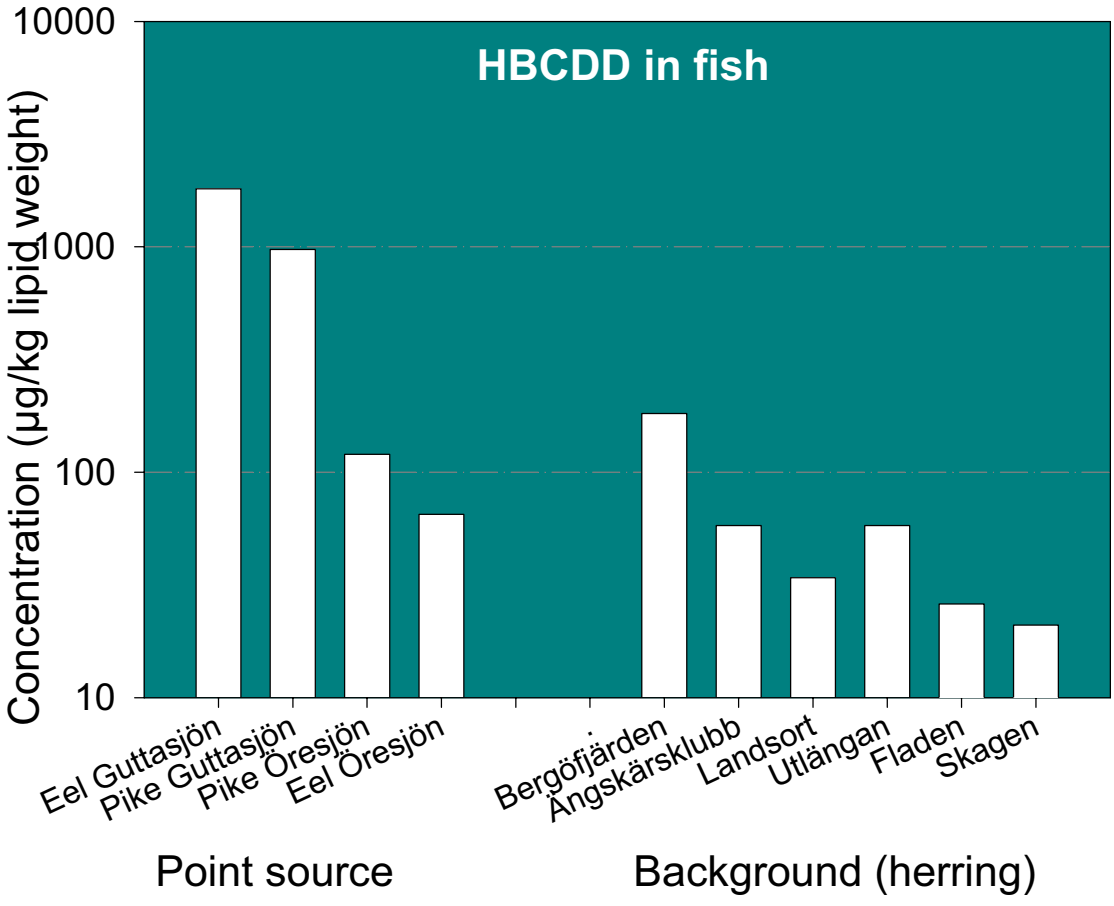
Diffuse Pollution
Urban–Area
Stockholm

The concentration of HBCD was determined in air, deposition, soil, sediment, sediment traps and municipal sludge






Deposition
Deposition rate (ng/m2*d)
1000
100
10
1
Sthlm sep-00
Sthlm jan-01
Pallas sep-00
Pallas jan-01
Rörvik sep-00
Urban
Background


HBCDD in fish
Concentration (µg/kg lipid weight)
10000
1000
100
10
Eel Guttasjön
Pike Guttasjön
Pike Öresjön
Eel Öresjön
Bergöfjärden
Ängskärsklubb
Landsort
Utlängan
Fladen
Skagen
Point source
Background (herring)

Conclusions

- An increased atmospheric concentration of HBCD was found at one point source where also increased concentrations occurred in soil. *However the use of HBCD is limited.*

- Minor amounts of HBCD were measured in municipal sludge from the Stockholm area.

- The concentrations of HBCD in sediments from Viskan (Borås area) were increased.

  The air samples did not confirm emissions from the textile industry today

- The atmospheric concentration of HBCD and the deposition fluxes found at the background stations were found in the same levels as individual PCBs

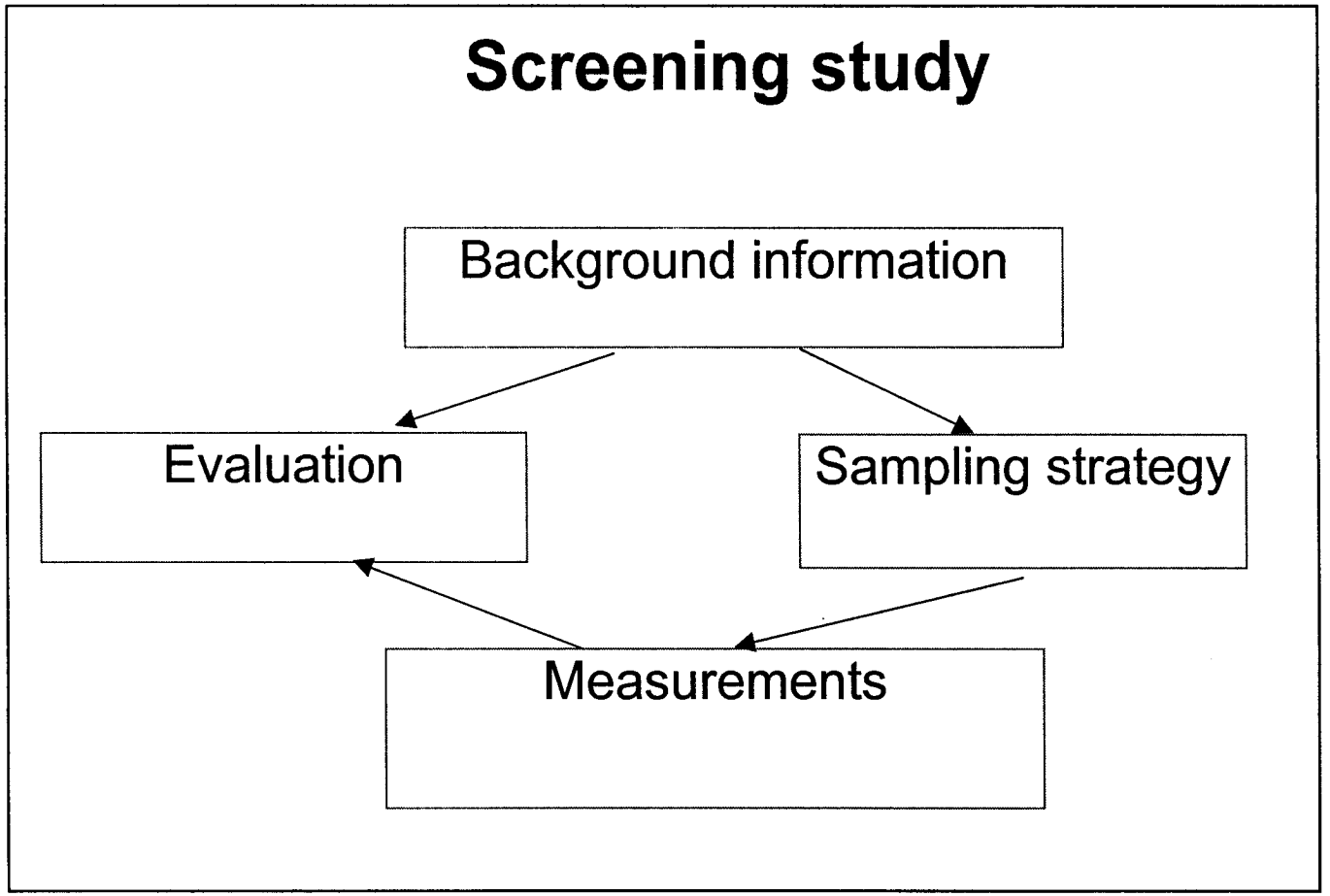
Conclusions

- The atmospheric concentration in the urban area was increased compared to the background stations.
  Diffusive sources?

- The concentration of HBCB in fish was lowest in the samples from Skagerrak and highest in the northern Baltic Sea

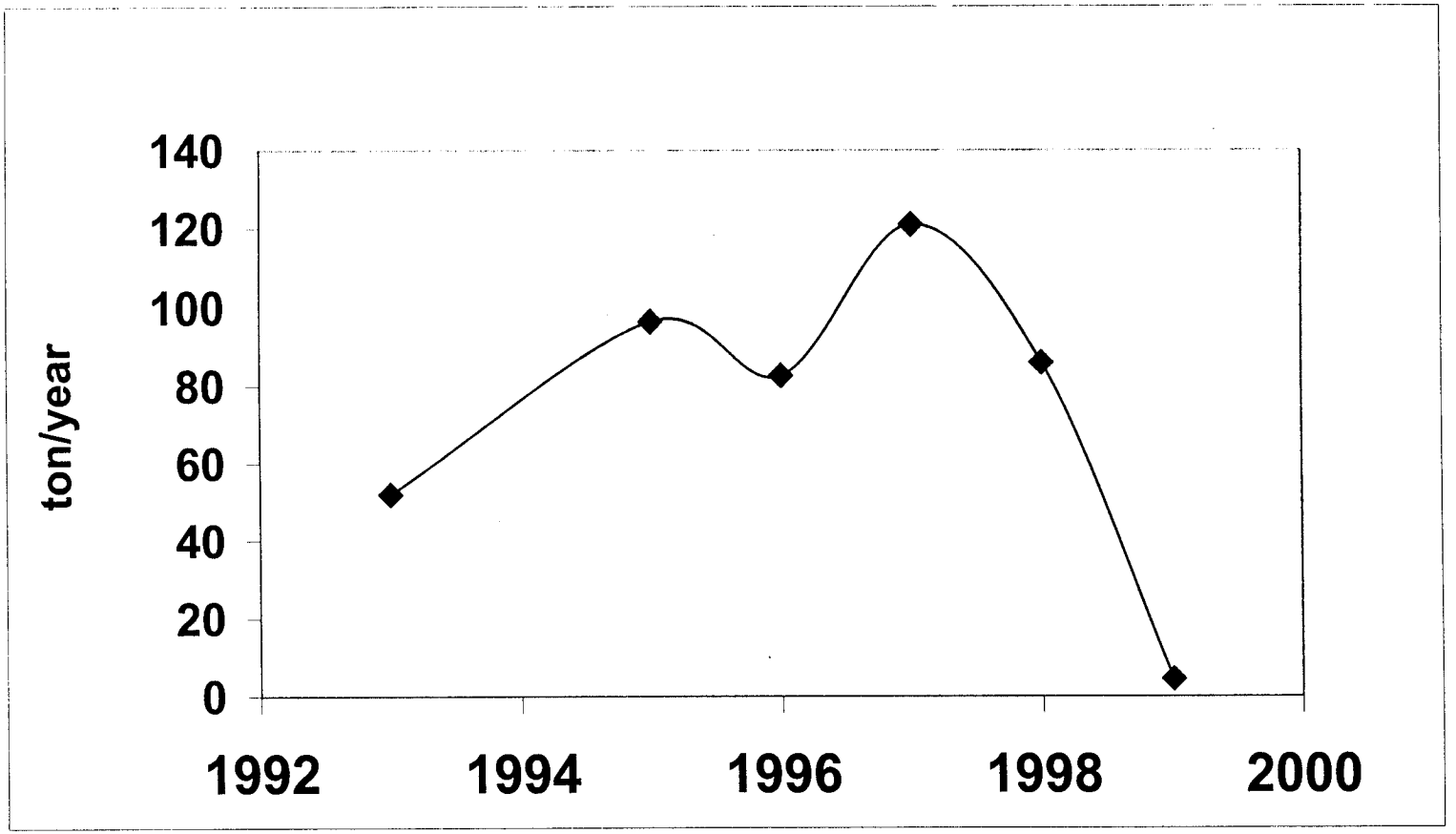
- The analyses of foodstuff showed that fish contained the highest concentrations.

Appendix 10
(E Brorström-Lundén: Slides)



Appendix 10
(E. Brorström-Lundén: Slides)

Amounts HBCD imported to Sweden



REF KEMI (1999)

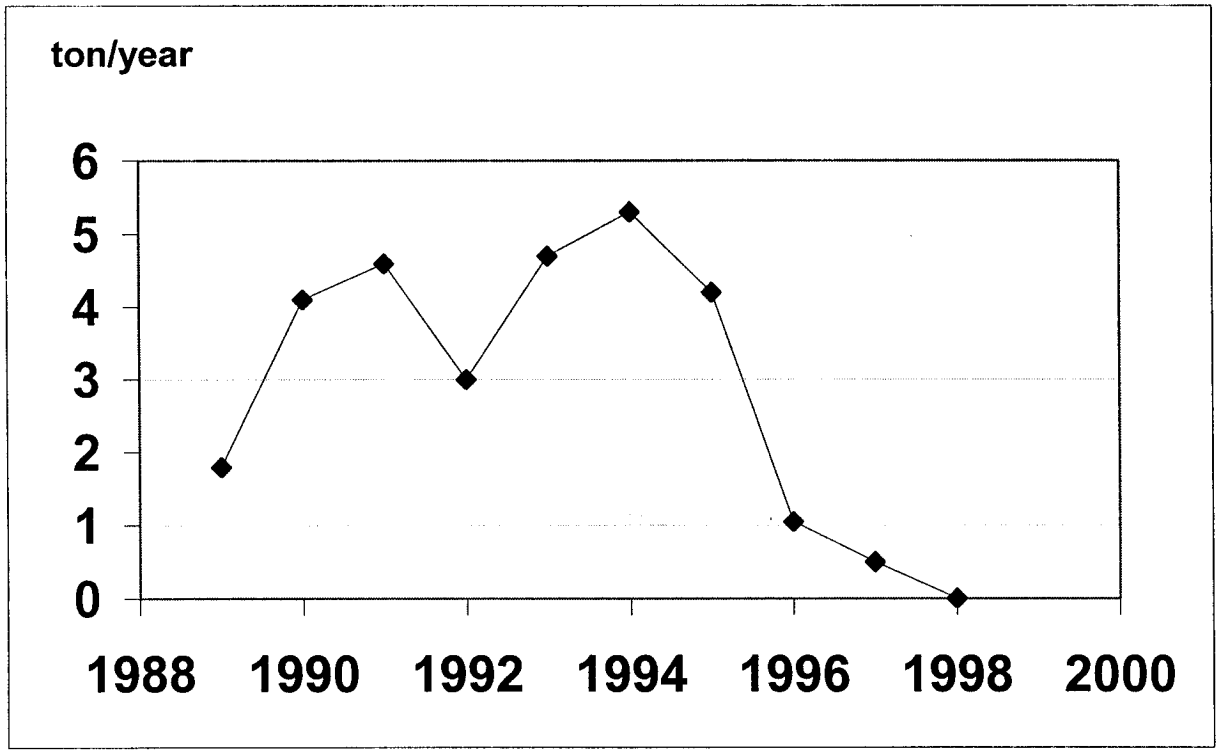
Appendix 10
(E. Brorström-Lundén: Slides)

Sampling program HBCD

	Air	Dep.	Soil	Water	Sludge	Sed.	Fish	Sum
Point sources								
Production	3		3			6	4	**16**
Landfills	2			2		2		**6**
Laundry				1	2			**3**
Diffuse pollution								
Urban area	2	2			4	9*		**17**
Background								
Remote	4	3					10	**17**
Human exposure								
Food samples							10	**10**
							SUM	**69**

**Including sediment traps*

Use of HBCD in the Swedish industry



REF Älvsborgs länsstyrelse.

Appendix 10
(E. Brorström-Lundén: Slides)

Media	SAMPLING
Air	IVL
Dep.	IVL
Soil	IVL
Water	IVL
Sludge	Stockholm water Co
Sediment	IVL
Sediment traps	ITM SU
Fish	Swedish National Museum of Natural History
Food samples	National Food Administration

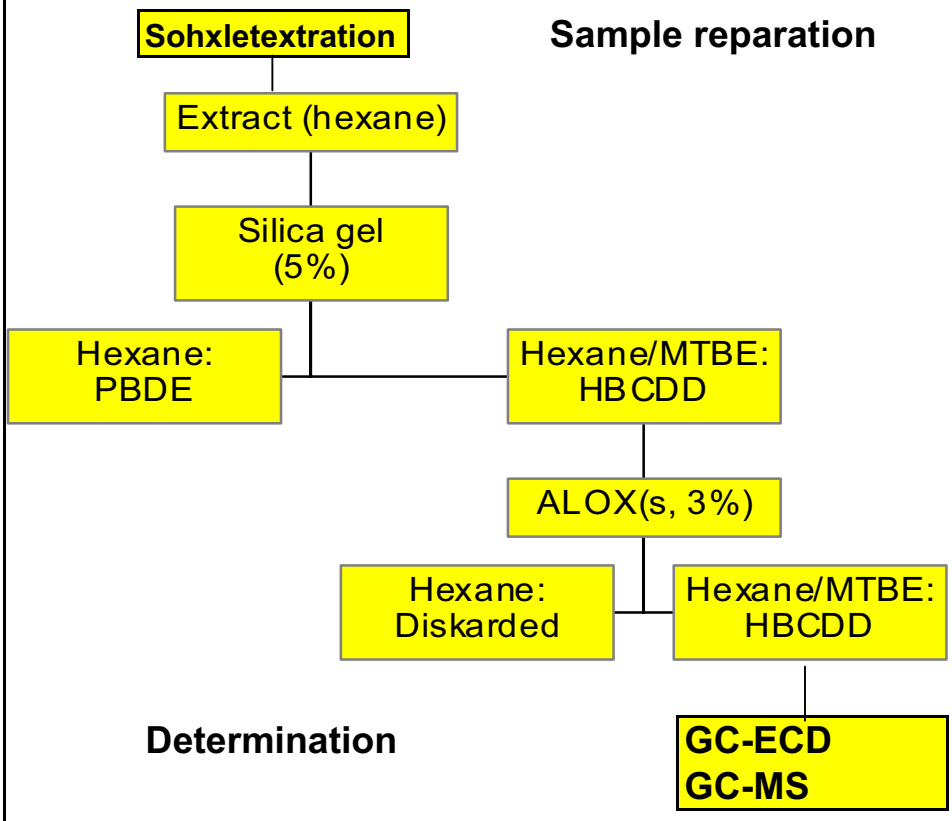
METHODS

SAMPLING

AIR

High volume air sampler	**PUF-plugs**	**Gas**
	Filter	**Particle**

ANALYSES



Quality Assuranse and Quality Control Program

SAMPLING SITES

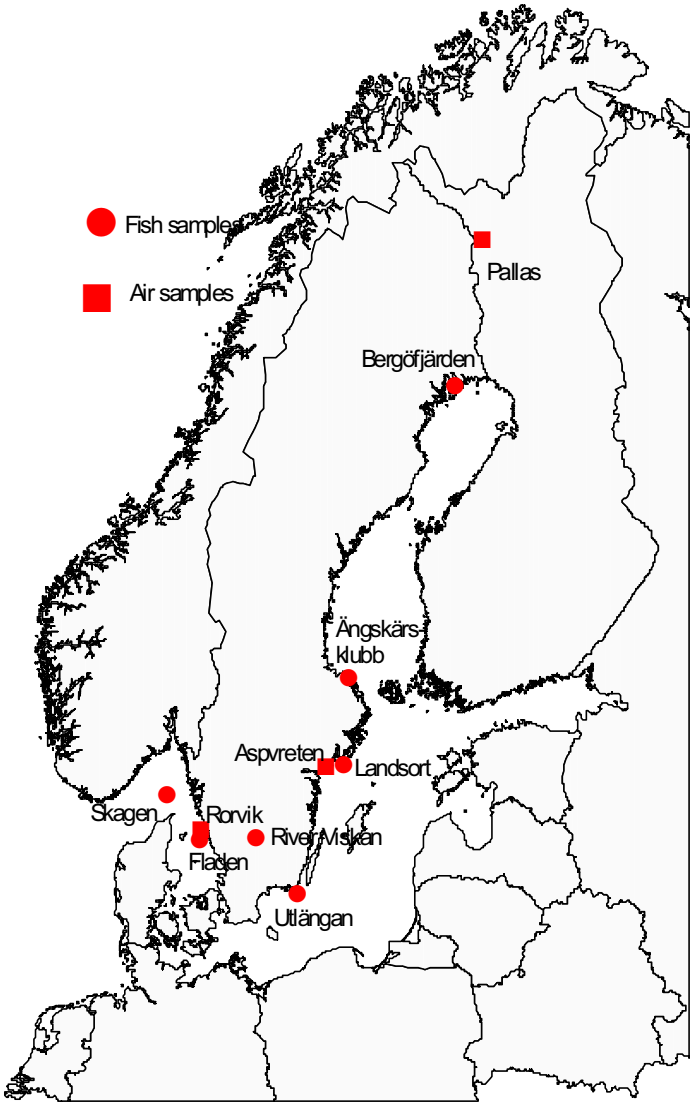
Point sources

Production	XPS-polystyrene	Norrköpning
	textile	Borås
Landfill	construction waste	Stockholm
Laundry	hospital textile	Stockholm

Appendix 10
(Eva Brorström-Lundén: Slides)

Background

Long-range transport



Workshop on Monitoring the Environmental fate of Chemicals

Sigtuna, June 6-8, 2001

Plenary Session 2:
"Which substances should be selected? How should they be monitored? Sources of information. Development of screening programmes."

A Joint Nordic Screening Programme

By Ola Glesne, Head of Section, Norwegian Pollution Control Authority.

In year 2000 a working group involving representatives of all the Nordic countries has been working on plans to perform a joint screening of hazardous chemicals in the environment.
A screening project gives a picture of the status at one certain time. It is carried out on a local, regional and national/continental scale and it is an inventory of the occurrence of a substance. A screening investigation makes us able to decide the needs for measures against the use of the substance or further monitoring of the substance in a regular programme. The screening results will also give important information to the Nordic co-operation in EU chemicals work.
There is no screening co-operation between the Nordic countries today. Therefore it is an important aim of the project to establish a common system for choosing compounds for screening and deciding how to implement the sampling, analysing, quality assurance and reporting. A joint Nordic project has a potential to deliver data of higher quality and broader relevance than each country can achieve alone. The co-operation will also help the countries to use their monitoring resources in a more effective way. We want to start the co-operation by choosing one "test substance" for a pilot project where we can work out how a Nordic screening programme should be designed and gain experience in practical co-operation. The two substance groups preliminarily suggested are phosphorylated flame retardants and clorobenzenes, but the choice is still open for discussion. We hope to start a screening co-operation next year.

The Swedish screening programme

Britta Hedlund, Naturvårdsverket, Sweden

The swedish screening programme was initiated in 1997. The resources have grown since it started and for 2001 a large number of substances can be measured.

With screening we mean an inventory of the possible presence of a substance or a group of substances in the environment. Investigation of human exposure is also a part of a screening investigation. The measurements are carried out where we expect to find the substance. Reference measurents are carried out in background areas.

Screening is by definition a short term project. It lasts for one or two years.

The result of a screening can be:

- the substance(s) are not found. No further investigations nereded at present.
- the screening should be repeated in some years from now
- the substance needs to be monitored further the measurements should be transferred to a monitoring programme.

So far the following substances have been screened

•1998 Chlorinated solvents
•1999 Chlorinated paraffins, an extended number of metals, pesticides
•2000 HBCD, TBBPA, an extended number of metals
•2001 Chlorophenols, organic tin-compounds, octylphenols, phosphorylated flame retardants, highly phosphorylated compounds, triclosan, metals, pesticides

A development project has been inititated in 2001 to prioritize substances for the coming years and to find out where they can be analyzed.

The Swedish screening programme

- What have we done so far?
- Strategy today

Britta Hedlund
Swedish Environmental Protection Agency

What do we mean with screening?

A summary of some discussions we have had

- A survey to find out whether a substance can be detected in the environment and if man and animals are exposed.
- The substance is not at present a part of ongoing time series measurements.
- Measurements are carried out where we can expect to find the substance. Reference measurements are also carried out.

Britta Hedlund
Swedish Environmental Protection Agency

The reasons for starting a screening can be several:

- It is one way to get information about all the substances in the environment found on different lists. We measure them at least at one point of time.
- It can be a basis to decide whether a substance should be incorporated into time series measurements.
- An ”early-warning”-system. Further investigations will be needed to find out the sources and the flows before actions can be taken.

Britta Hedlund
Swedish Environmental Protection Agency

What have we done so far?

Britta Hedlund
Swedish Environmental Protection Agency

Our strategy has developed……

No 30 man-year to put in

”Learning from doing”

FROM different investigations focused only on one media

TO structured inventories where we try to plan the investigations to get as much information as possible

In addition to this the funding has increased
from 500.000 SEK in 1997
to 4.000.000 SEK in 2001.

Britta Hedlund
Swedish Environmental Protection Agency

Substances and substance groups that has been screened so far:

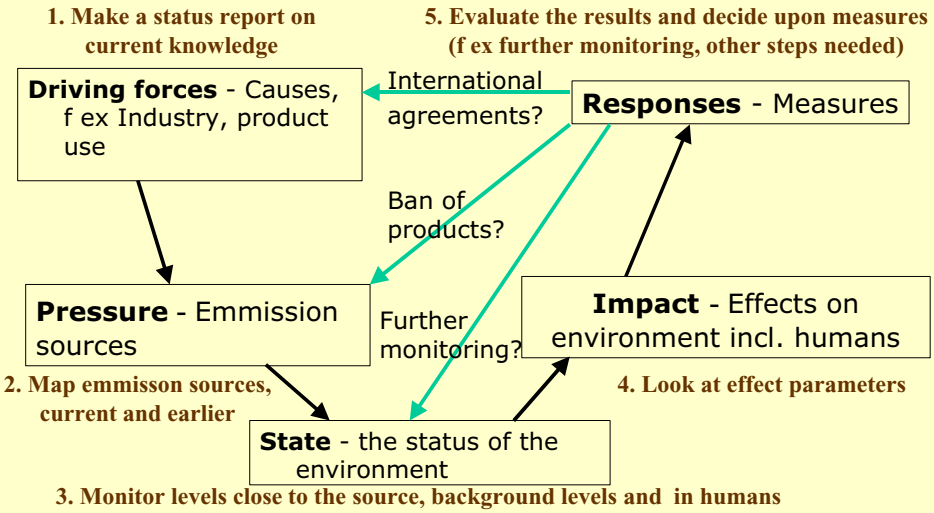
- **1997 Chlorinated solvents**
- **1998 Chlorinated solvents, undefined peaks**
- **1999 Chlorinated paraffins, an extended number of metals, PAH, pesticides**
- **2000 HBCD, TBBPA, an extended number of metals**
- **2001 Chlorophenols, organic tin-compounds, octylphenols, phosphorylated flame retardants, highly phosphorylated compounds, triclosan, metals, pesticides**

Britta Hedlund
Swedish Environmental Protection Agency

Our strategy for screening today

Britta Hedlund
Swedish Environmental Protection Agency

Planned according to the DPSIR model



Britta Hedlund
Swedish Environmental Protection Agency

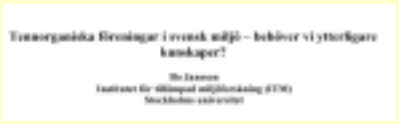
1. Make a status report on current knowledge


Final draft 2000-09-27

Pentaklorfenol och övriga klorfenoler

Är det fortfarande miljöföreningar att räkna med?

Ylva Lind och Per Ola Darnerud


Tennorganiska föreningar i svensk miljö – behöver vi ytterligare kunskaper?


FOSFORBASERADE FLAMSKYDDSMEDEL – BEHOV AV SCREENING AV HALTER I SVENSK MILJÖ?

- Where has the substance been used? For what purpose?
- What can we expect based on the properties of the substance?
- What data are available concerning releases to the environment and human exposure?
- Where do we have a lack of knowledge?

Britta Hedlund
Swedish Environmental Protection Agency

2. Map emmission sources

- **Products**
- **Imported goods**
- **Industrial use**
- **Use as raw material?**
- **Earlier use**
- **Sources of diffuse emmission**
- **etc...**

Britta Hedlund
Swedish Environmental Protection Agency

2. Indentify material flows

One example of division of flows

- Industry
- Households
- Traffic/transport
- Agriculture
- Forestry

Britta Hedlund
Swedish Environmental Protection Agency

3. Monitor levels

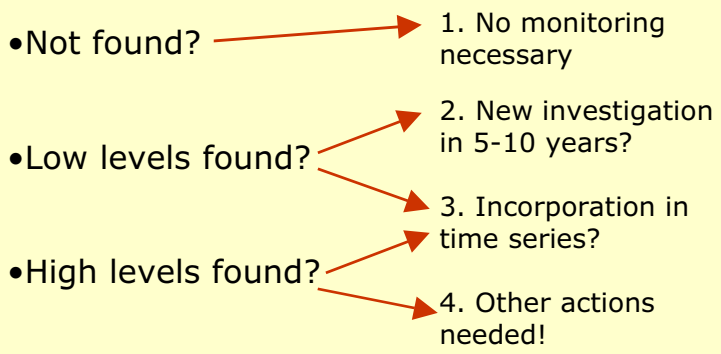
Some proposals:

Other substances on EU directive lists and convention lists such as:

- **pesticides** (f.ex. diuron, endosulfan)
- **PAH:s** (f.ex. anthracene, naphtalene)
- **Nonylphenols**
- **Phtalates** (f.ex. DEHP)
- **Triclorobenzenes**
- **Chlorinated paraffins**
- **Biocides**

Britta Hedlund
Swedish Environmental Protection Agency

5. Evaluate the results and decide upon measures (f ex further monitoring, other steps needed)



Britta Hedlund
Swedish Environmental Protection Agency

Planned screening 2002, what we know so far

- **Phosphorylated flame retardants (cont.)**
- **Phtalates**
- **Organic tin compounds (cont.)**

To prepare for 2002 and further on

- **a project will be carried out to summarize background information and make a national priority list.**
- **a summary of of laboratory analyzing capacities in different countries**

Britta Hedlund
Swedish Environmental Protection Agency

Measurents in water 2001

- Fish will be collected from 9 different locations representing sea, coast and lake
- Prel. dioxins, flame retardants, chlorobensenes, ftalates, chlorophenols, PAH:s will be analyzed.

Britta Hedlund
Swedish Environmental Protection Agency

How is data collected and stored?

Some information about our data hosts

Britta Hedlund
Swedish Environmental Protection Agency

What is a datahost?

To make the data from national environmental monitoring more accessible, data hosts have been established for the storage and distribution of quality-assured environmental monitoring data.

Britta Hedlund
Swedish Environmental Protection Agency

What does a datahost do?

A data host must receive and store results from national monitoring in a certain subject area and make them accessible via a computer medium. They must also carry out certain plausibility tests and quality controls on measurement results.

Britta Hedlund
Swedish Environmental Protection Agency

To a limited extent, even regional results will be available at data hosts. Otherwise, it is the responsibility of each county administrative board to carry out this function. The copyright for national and regional environmental data generated by monitoring activities is guaranteed by an agreement between the Swedish EPA and the county administrative boards.

Britta Hedlund
Swedish Environmental Protection Agency

Which organisations are datahosts?

Data host	Type of data handled
Swedish Meteorological and Hydrological Institute **SE 601 76 Norrköping** www.smhi.se	Meteorological observations, climate data, oceanographic data, hydrographic data
IVL **Box 470 86** **SE-402 58 Göteborg** www.ivl.se	Air pollution. Concentrations of toxic substances and metals in biological material (non- human)
Swedish University of Agricultural Sciences, Dept. of Soil Sciences **Box 7050** **SE-750 07 Uppsala** www.mv.slu.se	Agricultural land, mainly conc. of nutrients in surface water, drainage water and groundwater, cultivation measures, transport estimates and conc. of metals and nutrients in soil and crops
Swedish University of Agricultural Sciences, Dept. of Env. Assessment **Box 7050** **SE-750 07 Uppsala** www.ma.slu.se	Chemical and biological measurements in freshwater (not fish)

Britta Hedlund
Swedish Environmental Protection Agency

Which organisations are datahosts?

Data host	Type of data handled
Stockholm Marine Research Centre **Stockholm University** **c/o Inst. of Systems Ecology** **SE-106 91 Stockholm** www.smf.su.se	Variables of marine biology
Swedish National Fisheries Board **Freshwater Laboratory** **SE-178 93 Drottningholm** www.fiskeriverket.se	Fish specimen, integrated fish monitoring, follow-up of effects, liming
Geological Survey of Sweden **Box 670** **751 28 Uppsala** www.sgu.se	Ground water
(Institute of Environmental Medicine **Box 210, 171 77 Stockholm** www.imm.ki.se)	(Measurements in humans, human exposure measurements)

Britta Hedlund
Swedish Environmental Protection Agency

Screening projects in Finland

Johanna Peltola, Finnish Environment Institute, Chemicals Division, johanna.peltola@vyh.fi

Two screening projects are underway in the Finnish environmental administration in 2001. Scope of the first project is groundwater. It is a pilot study in the City of Lahti. The other one, targeted to the rest of the environmental matrices and releases, is in the planning phase in 2001. In addition, screening of some brominated flame retardants was conducted in 2000 by the Finnish Environment Institute.

1. Pilot screening study of ground water in the City of Lahti

Objective

The aim of the study is to see the actual ground water chemical status in the scope of the Water Framework Directive (WFD). The study should also give a picture e.g. of how intensively ground water should be monitored to satisfy the WFD needs and what substances are necessary to analyse in aquifers of different character.

Approach

- List of prioritised pesticides will be analysed in ground water used for drinking water. WFD priority substances, substances with high use volume and high potential for leaching have been prioritised for analysis.
- Unknown additional pollutants detected are tried to be identified from the samples.

Sites

- Approximately 15 ground water aquifers in the City Lahti and surrounding area will be studied. Major part of the aquifers are at the moment utilised for making drinking water .

Project group

- Ground water group of the Finnish Environment Institute
- City of Lahti

2. The national screening project

The Finnish Environment Institute is planning general screening of environmental concentrations and releases in 2001. The planning phase of the project is funded by the Ministry of Environment and the Finnish Environment Institute. Funding for and participation in the actual sampling, analysis and reporting will be requested from a group consisting of industry, ministries, counties and research institutes.

Objective

- To gain data on environmental concentrations of substances for the assessment of impacts in the scope of the EU water framework directive (article 5);
- To get a view of how much resources and development is needed for monitoring required by the WFD;
- To observe environmental levels of such presently used substances which are of concern internationally;
- To observe the possible environmental exposure of chemicals in use in Finland;
- Update the perception of what substances are actually released into the environment from point sources -> consequences for polluter monitoring requirements.

Approach

The prioritised substances will be analysed from sites where:

- concentrations are expected to be at their highest (at and near sources);
- concentrations represent "average" or "typical" concentrations in the region;
- background samples will be analysed if the substances are detected in the "average" case.

Process

1.	Choosing the substances/chemicals for the planning phase and identifying the relevant isomers and transformation products for laboratory analysis;
2.	Checking the availability of analysis services for each substance + available methods; Listing of properties relevant to screening;
3.	Literature review to find out what concentrations can be expected to be found; Relevant sample type identification;
4.	Identification of domestic sources of the substances; Deletion of those substances from the list which do not seem relevant according to the source identification;
5.	Sampling site identification (for each substance or substance group relevant sites; highest concentration areas and average areas); Relevant archived samples to be chosen (e.g. for a time trend in biota);
6.	Sampling and analysis 2002-2004;
7.	Reporting 2003-2004 (for WFD article 5 assessment reporting must be done by the end of 2004);

The final amount of substances and sites will depend strongly on the received funding, available analytical resources and participants. Also lacking analytical services may limit the amount of substances.

Criteria for choosing substances for screening

The following substances will be considered in the screening project and should be considered to be included into the polluter or public monitoring programs in general where relevant:

- Water framework Directive's community priority list of hazardous substances;
- 74/464/EEC Directive's substances relevant to Finland (so far no monitoring of most of these substances);
- Relevant substances from the EU existing chemicals program;
- Relevant priority substances of international conventions and monitoring programs (UNECE's CLRTAP, HELCOM, OSPAR,…);
- The Finnish priority chemicals in use (based on PBT –properties, not volume)
- Major substances from processes (industrial, combustion);
- Pesticides in use (all toxic by nature, thus toxicity not a choosing criteria):
  - Those with highest sales volume;
  - Most persistent and bioaccumulable pesticides with high sales volume;
  - Easily leaching pesticides with high sales volume;
  - Those which are used intensively in small areas for specific purposes;
- Biocides in use (all toxic by nature, thus toxicity not a choosing criteria):
  - From all relevant use categories;

Most persistent with highest sales volume;
Most bioaccumulable with highest sales volume;
Endocrine disrupting substances;
So far sales volume known only for slimicides and wood preservatives, which has restricted the prioritisation;

- Other substances of concern: expert judgement.

3. Brominated flame retardant screening in 2000

Screening of some brominated flame retardants (BFRs) was carried out in 2000 in the Finnish Environment Institute. Aim of the project was to obtain a rough picture of levels of BFRs in the environment and to confirm their presence. The project was carried out with very limited resources. The working process included rough assessment of import based on the Finnish chemicals product register, rough identification of possible point sources of BFRs, identification the most interesting BFRs for analysis and locating of the relevant sampling points.

Approximately 25 samples were drawn from coastal sediments, urban creek sediment, municipal landfill and metal dismantling plant landfill leachates, urban storm water, municipal WWT sludge and air. Also municipal incinerator ashes, surface water pike, coastal pike and Baltic salmon from two different stocks were analysed. Analysis was obtained either from pooled or single samples depending on the sample type. The samples were analysed for polybrominated diphenyl ethers present in the commercial pentabromodiphenyl ether mixture, decabromodiphenyl ether, hexabromocyclododecane and tetrabromobisphenol a.

The analysis showed that above substances are present in Finnish samples at similar levels found in Sweden and elsewhere in Europe.

7.6.2001

Screening projects in Finland

Johanna Peltola
Finnish Environment Institute
Chemicals Division

FINNISH ENVIRONMENT INSTITUTE

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7.6.2001

THREE SCREENING PROJECTS:

Pilot groundwater study in the City of Lahti
- Objective: Water Framework Directive

"National" screening project
- Objective: several

Screening of some BFRs in 2001
- Objective: RA/RRS, "general concern"

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Johanna Peltola

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7.6.2001

GW PILOT STUDY, LAHTI

Funding

- ⌘Ministry of Environment
- ⌘City of Lahti, municipal drinking water company ➟environmental laboratory of the city

Objective

WFD pilot:

- preliminary pressure identification
- search the possible monitoring set of substances

7.6.2001

Substance list approach

Pesticides:

- !WFD §16 substances
- Most used (MCPA, glyphosate,…)
- Most water soluble, commonly used
- Most persistent with highest sales volume
- Intensively used with highest sales volume

! Identification of unknown contaminants

7.6.2001

Sites

Ca. 15 GW aquifers:

- urban aquifers
- next to landfills
- graveyard
- gravel mining
- traffic

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7.6.2001

National screening project

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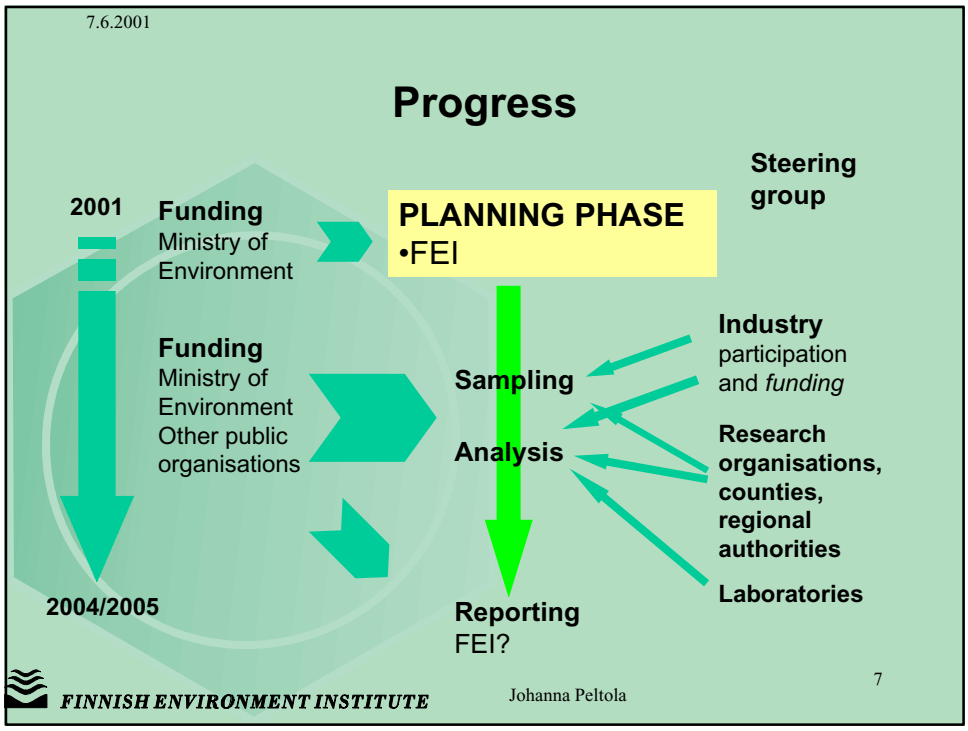
7.6.2001
Progress
Steering group
2001
Funding
Ministry of Environment
PLANNING PHASE
•FEI
Funding
Ministry of Environment
Other public organisations
Sampling
Analysis
Industry participation and *funding*
Research organisations, counties, regional authorities
Laboratories
2004/2005
Reporting
FEI?
FINNISH ENVIRONMENT INSTITUTE
Johanna Peltola
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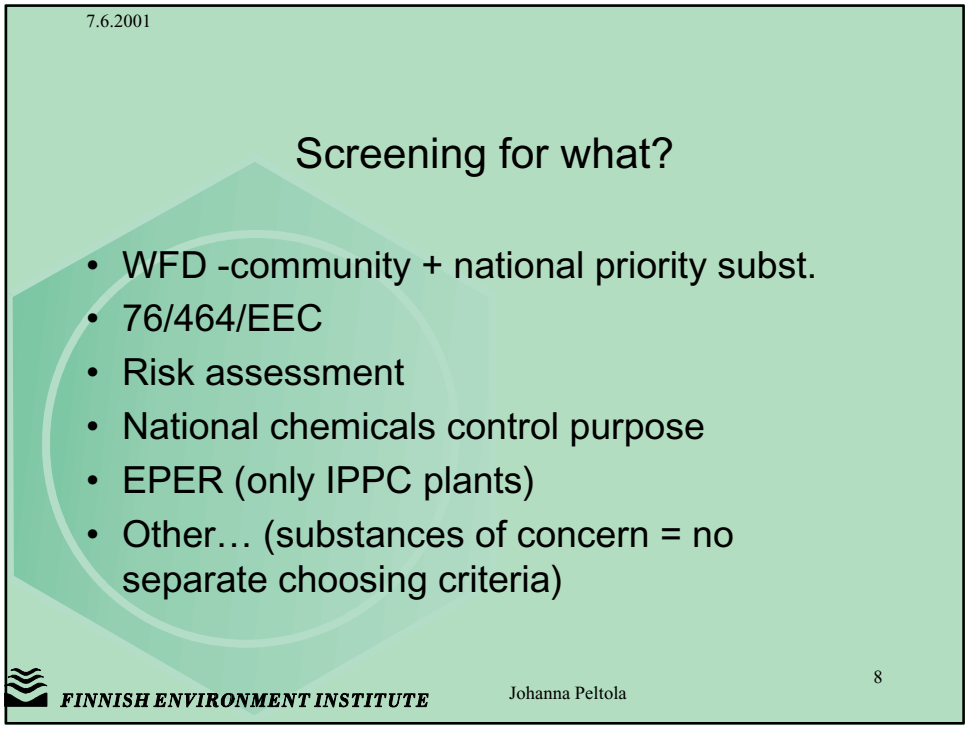
7.6.2001
Screening for what?
• WFD -community + national priority subst.
• 76/464/EEC
• Risk assessment
• National chemicals control purpose
• EPER (only IPPC plants)
• Other… (substances of concern = no separate choosing criteria)
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7.6.2001

Approach

Initial list → planning process → final list

- WFD community substances
- 76/464/EEC: those found in the Finnish product register
- Finnish priority PBT substances
- Chemicals in use in Finland and prioritised for monitoring
- other

7.6.2001

Finnish PBT chemicals in use

Chosen with treshold values of:

- persistency
- bioaccumulation
- toxicity

From the Finnish product register

Mainly NSDB property data used

!Lack of data -substances were left out

7.6.2001

Chemicals prioritised earlier for monitoring

Biocides:

- most used
- most persistent most used
- most bioaccumulating most used

Pesticides:

- most used
- most persistent most used
- most water soluble/leaching
- most intensively used

Finnish HPV list

7.6.2001

Initial list substances:

5+ Phtalates
3+ BFRs (groups)
4+ Organophosphorus FRs (groups)
63 other industrial
2+ byproduct groups

37 pesticides
24+ biocides
7 heavy metals + comp.

7.6.2001

CAS	Biocides
793248	1,4-Benzenediamine, N-(1,3-dimethylbutyl)-N'-phenyl-
56073100	Brodifacoum
28772567	Bromadioloni
52517	Bronopoli eli 2-Bromo-2-nitropropane-1,3-diol
2921882	Chlorpyrifos
68359375	Cyfluthrin
52918635	Deltametriini (myös torj.a)
333415	Diatsinoni
1192525	Ditioli
6317186	Metyleeni-bis-tiosyanaatti
52645531	Permetriini (myös torj.a)
21564170	TCMTB eli (2-benzothiazolylthio)methyl thiocyanate
3380345	Triklosaani eli 5-Chloro-2-(2,4-dichlorophenoxy)phenol
	Organotinayhdisteet

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7.6.2001

Tasks for the planning phase

- Identification of sources (partly WFD §5 implementation…
  - **Point source identification: activities liable to environmental permit**
  - **Diffuse source identification:**
    - **Agri/silvicultural**
    - **Other use of pesticides (! Cities)**
    - **Traffic**
    - **Urban center/residential**
    - **…….**

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- Properties (fate issue: right sample type)
- Literature review: What concentrations to expect and where
- Checking the specimenbank
- Laboratory issues:
  - Finding out the laboratories, quality assurance
  - What do we actually measure when we analyse a chemical ?????? Isomers & transformation products
  - WHAT DOES IT COST?

7.6.2001

Right site selection for each substance

WFD substances: AREAS representing the "worst case", "average case" and good-high quality; different areas for different chemical uses;

RA substances: "local" and "regional" sites;

BG area only if substances found closer to source;

Releases always when relevant;

7.6.2001

Medium of exposure (end point)
Surface water in the recipient during the discharge period (distance where the effluent has completely mixed with the recipient water)
Surface water in the area reflecting the total pollution load (point and diffuse sources)
Sediment in the recipient at a time reflecting the effect of the discharge period (during and immediately after the discharge; distance where the effluent has completely mixed with the recipient water)
Sediment in the area reflecting the total pollution load (point and diffuse sources)
Soil within 1000 m from the emission point
Agricultural soil in the area reflecting the total pollution load (point and diffuse sources)
Fish
Earthworms
Sewage sludge

7.6.2001

Screening of some BFRs in 2000

Starting point:

- **3 manmonths + 130 000 FIM for analysis**
- **No information on import/use**
- **No knowledge base on BFRs**
- **One fish study on PBDEs by Public Health Institute**

7.6.2001

Process

- Choosing the laboratory -> IVL Miljöinstitutet
- Choosing the substances: PBDEs, HBCD, TBBPA
- Choosing relevant sample matrixes

7.6.2001

Sampling plan

- BDE-47, BDE-99, BDE-100, BDE-153, BDE-209
- TBBPA (+ MeO-TBBPA), HBCD
- WWTP sludge: 2 sites, pooled
- Coastal surface sediment, 3 sites, pooled
- Urban creek surface sediment
- Storm water
- Landfil leachate

7.6.2001

- Ashes from MSW incinerator, 2 sites
- Storm water creek sediment from dismantling plant
- Landfil leachate of a dismantling plant
- Fish: 10 salmon samples from 2 rivers; 3 pike samples (pooled)

- ➪ confirmation on: levels same as elsewhere in Europe + some extra information

7.6.2001

Issues to elaborate

- What do we analyse when we analyse a chemical (isomer & transformation issue)
- Where is a real background site for chemicals in use? Scrutinize the present sites.
- Nationally interesting substances: should we agree on common treshold criteria for prioritising substances for monitoring? (PBT, solubility, etc.)
- Urban area monitoring site needed!

Magnus Nyström
Finnish Environment Institute
Chemicals division

Reflections on Nordic co-operation in Monitoring;
The secretary of the Nordic Chemicals Group

As we all very well know the activities associated with the chemicals management take places on several levels. There are as well local, regional and national activities as international and global activities. People involved in these activities have to consider very carefully on what level they should put their main efforts. You simply cannot be efficient on all levels at the same time.

The topic for this presentation is some reflections on the Nordic perspective and more specific from the viewpoint of the Nordic Chemicals group. A fruitful starting point for such reflections could be to consider which are the strengths of the Nordic cooperation compared to other levels.

The Nordic working group on chemicals constitutes a forum for coordination of chemicals management, mainly among governmental authorities in the Nordic countries. The business dealing with chemicals is generally multinational. As a consequence also the governmental management of chemicals, including research, supervision and regulation, has a very international nature.

My first conclusion is then that some kind of international cooperation is needed and that isolated local and national approaches do not give optimal tools for risk reduction.

On the other hand the Nordic cooperation is generally only a part of a broader approach.

It has often been said that the Nordic countries have many significant similarities. (There are differensies too, but let's for a while concentrate on the similarities.) Examples of relevant similarities are the climate and cultural and legislative infrastructure based on a long history of interaction.

The cooperation is based on a very flexible and voluntary basis. The Nordic countries do not usually make binding agreements forcing all parties to stay in line. On the other hand the all countries have quite high ambitions on the field of environmental protection. In this way it is easy to have open discussions between experts from all countries learning from each others.

Although there are significant gaps in the knowledge about the fate of chemicals used in the Nordic countries the infrastructure and existing data in these countries form a good basis for further development. In the further development it is important to involve also regions outside the Nordic countries because the chemicals used in adjacent regions (Russia, the Balkans,

Poland Germany, the Benelux countries, France, United Kingdom and North America) directly affect our environment. Nordic activities to fill in the data-gaps by improving screening, monitoring and material flow analyses (including product registers and statistic tools) must be developed with transparent exchange of views and openness for involvement from organisations such as HELCOM, OSPAR and AMAP. Examples of more or less fruitful activities in these organisations can be presented.

In an ideal world the investigation of the fate of chemicals should follow standardized methods and strategies. To wait for international consensus before any step forward would however slow down the process (probably often stop it). Although the Nordic countries have quite similar infrastructures and traditions agreements on common practical actions are sometimes difficult to achieve. National activities can be used as useful pilot projects for later international cooperation. International cooperation can then be practised on a Nordic level before videning the activities to a wider, possible global scale. A condition for this is that the national activities are developed and maintained in an open and flexible way and do not form rigid obstacles for an adaption to later international activities.

Why Nordic Cooperation on Monitoring the Fate of Chemicals – and in what Areas?

Harry Zilliacus, NMD Secretary

In developing joint environment monitoring methods and programmes, and in harmonising data processing procedures (sampling, intercalibration, data bases, exchange of data), the Nordic countries and the self-governed areas under the Nordic Council of Ministers, strive for what has been called 'Nordic advantage'. This has been done since 1993, when the Nordic Working Group on Monitoring and Data was formed and when monitoring and data activities in northern Europe thus were brought under one single roof.

By combining our - in many cases - scarce resources, we can achieve Nordic results that would require considerably more of each of us would we be forced to manage on our own on national resources only. By adding our national spices into the soup, the outcome becomes more delicious as it is both larger, tested many times over, idiot proof, and, above all, it is a lot cheaper calculated nationally in working hours spent on the job or in reduced costs for equipment needed for field or laboratory performance when developing the product sought for jointly. Naturally, this does not mean that in adapting the method to our national routine monitoring activities, we would still be able to rely on our Nordic neighbours financially. It does mean, however, that the tools are there, each of us will know how the others have produced their results (compatibility), and that we can join in refining the product would that be necessary at any point further on.

It is often, e.g. for expensive and time-consuming development work, generally appreciated that there will be national savings when coming together under the NCM looking for a product demanded by the environment authorities, and which one otherwise would have to develop oneself sooner or later. By exchanging views and experiences with the Nordic neighbours in a given field of environment protection work, one may also be able to maintain a certain level of national expertise and competence useful for any future cooperation asked for by the international community. In this sense, an advanced Nordic country may be picked to be in charge of a joint development project while others will invest less but nevertheless take advantage of the achievements worked out for everyone to implement. In a slightly altered situation 10 years after, roles may change still not excluding anyone from taking part as the leader or as the 'freepassenger'. We are thus in a continuous position of just picking the train we would like to jump on to see where it is going. We commit ourselves to very little, but can gain enormously. In many ways, this kind of arrangement is more beneficial than which is the case for large international organisations where a certain degree of financial or expert commitment is required regardless of the specific national needs at that moment in time.

An important aspect of NCM Cooperation is looking at our joint efforts as enhancing our Nordic identity, and guaranteeing that this part of the continent is taken into account and internationally integrated by those who know it best. The risk here is becoming too dependent on paneuropean spokesmen, who on the whole may wish us all the best but not always be fully aware of the specific

characteristics and environmental conditions of the far north. Only the cat itself is willing and can raise its own tail. In doing so, we can be sure that our Nordic needs will get well-known and not be overseen by other actors as part of a larger European scheme. Small countries showing – from an all-European angle – marginal characteristics and environmental problems, should stick together and make the best of all resources at hand. This is quite easy for people who know each other, and who often have the same requirements in terms of environmental mitigation or management.

The cold conditions of the north as well as the Baltic Sea and the North Atlantic are good examples of issues typical of the Nordic countries – this is our backyard and by focussing on themes and areas like these we are sure to get the best possible results and answers to the problems most imminent to us. It is quite obvious that we will need the collaboration of our adjacent areas (Russia, the Baltic States) to be able to get the spatial coverage required. As the EU enlargement finally will reach the Baltics, special attention will inevitably have to be paid on the environmental conditions of north-western Russia.

The NMD Working Group, by its mandate, has combined the overall expertise for the development of monitoring and data activities in the area of the Nordic countries widened by our adjacent areas. There have been no restrictions as to media – terrestrial, air and water problems have all been treated alike as well as, for instance, biodiversity matters that stretch through all of these. What has been crucial is whether we can come together and thus provide as many of the Nordic countries as possible with a monitoring tool (method, indicators, programme, state of environment report, data harmonisation) that without commitment of time or extent can be taken to these countries and implemented into national routine monitoring work. Priority has naturally been given to the goals agreed on and set in the NCM Action Plans, the current one running from 2001-2004.

It is our sincere intention that the monitoring and data processing tools designed by NMD prove useful for other NCM Working Groups too, and that we can get the thematic response we need from these groups to fully understand the specific problems involved. As the planned monitoring activities nearly regularly include various aspects of the environment, we have found that keeping all monitoring & data affairs in one single box – i.e. one Working Group only - will give us the horisontal overview to tackle the complex task of harmonising Nordic monitoring practise. This has been true also for cases where e.g. chemical elements or compounds are the main concern of the planned monitoring activities such as in our long-term work for introducing the IM Programme to the adjacent area countries, mapping heavy metal deposition in Europe, or the more recent determining of human influence on water chemistry of Nordic lakes. When there are difficult multi-disciplinary matters to solve, however, it certainly seems necessary for more than one group to put their knowledge and experience at stake and start designing monitoring and data activities together. Strategically and in relation to the external world, it is therefore of great importance we combine our intentions and resources not only among the countries, but likewise under the NCM umbrella. This will make both our countries and our organisation stronger.

* * * * * * * * *

Abstract

Environmental POPs and the role of the Nordic Working Group on Sea an Air Pollutants

Gun Lövblad,
Secretariate for the NMR Working Group on Air and Sea Pollution

The Nordic countries and its surroundings in the Baltic countries and in the Arctic area are influenced by pollutants via long-range transport in the atmosphere as well as in the sea. Examples of environmental effects on the regional scale are acidification of soil and surface waters, eutrophication of coastal marine areas, accumulation of POPs and metals in biota and human health impact, mainly via ozone and air-borne particles.

The sources for this type of pollution are only partly localised within the Nordic area, and the problem is to a great extent caused by emissions in other European countries. Since large parts of the Nordic countries have a similar sensibility of ecosystems and are influence by the same sources, much is gained by coordinated action. A joint action will increase pressure on neighbouring countries and will strengthen coordinated activites within EU. The joint Nordic strategy has been successful for sulphur emission reductions in Europe and could be used also reducing other regional scale environmental effects.

The reduction of pollutants in the Nordic area is an important part of the efforts of reaching a sustainable development in the Nordic area and the work of the Air & Sea group includes mainly the problems requiring actions within other countries. The main task for the group is to provide scientifically sound common basis for negotiations. Most work has been made within the Convention of Long-Range Transboundary Air Pollutants (CLRTAP) and within the marine commissions HELCOM and OSPAR. The effort is now increasing towards the EU atmospheric and marine pollution work.

The aim of the group has been to create a strong interaction between research and policy work, based on the assumption that all environmental problems depend on scientific research for its discovery, as well as for its solution. An atmospheric model is available for optimizing the control actions towards air pollution. The group is now focussing its actions on marine pollution with its experience from the CLRTAP work. Further, an operative model system is being elaborated to follow the fate effluents to the sea as well as the atmospheric deposition to the sea surface in the Baltic and in the North Sea.

The POPs require coordination of abatement of atmospheric emissions as well as marine effluents. In order to carry out cost-effective control strategies, the combined

experience of atmospheric and marine pollution is necessary. The atmospheric model and the marine model system will make a basis for the future abatement strategies.

The priorities of the group for the coming 2 - 4 years as regards POPs are to support the coordinated provision of basis for negotions on a Nordic scale on the following topics:

- Identifying sources and estimating the input of POPs/chemicals in different phases, their transfer, the exchange between atmosphere and sea, water and sediments as well as fluxes and concentrations in different marine surroundings.
- Relationships between emissions, exposure and effects
- Summarizing and validating dose-response for single componenet and interacting effects of POPs
- Using biomarkers for biological effect studies on POPs and critical loads for mercury.
- Risk assessments for marine biology by the presence of hazardous (incl. hormon liknande) substances.
- Methods for assessing the hazardousness of chemical
- Consequencies of existing recommendations and decisions.

The working group on air and sea pollution

The Nordic countries and surroundings

influenced via long-range transport of pollutants in the atmosphere as well as into the sea.

- acidification of soils and surface waters
- eutrophication of coastal marine areas and terrestrial ecosystems
- accumulation of POPs and metals in terrestrial and marine ecosystems and biota
- human health impact, mainly via ozone and air-borne particles.

IVL

Gun Lövblad IVL

The working group on air and sea pollution

Nordic coordination is essential since:

Sources of regional pollution are largely localised outside the Nordic area.

Large parts of the Nordic countries have similar sensitivity of ecosystems and are influenced by the same sources.

A joint action will increase pressure on neighbouring countries and will strengthen coordinated activites within EU.

The joint Nordic strategy has been successful for sulphur emission reductions in Europe and could be used also for reducing other regional scale environmental effects.

IVL

Gun Lövblad IVL

The working group on air and sea pollution

The reduction of pollutants in the Nordic area is an important part of the efforts of reaching a sustainable development in the Nordic area (Strategy for Baeredygtig udvikling)

The work of the Air & Sea group includes mainly problems requiring actions within other countries.

The main task for the group is to provide scientifically sound common basis for negotiations.

Most work has been made within the Convention of Long-Range Transboundary Air Pollutants (CLRTAP) and within the marine conventions HELCOM and OSPAR.

The effort is now increasing towards the EU atmospheric and marine pollution work.

IVL

Gun Lövblad IVL

The working group on air and sea pollution

The aim

To create a strong interaction between research and policy work, based on the assumption that all environmental problems depend on scientific research for its discovery, as well as for its solution.

An atmospheric model is available for optimizing the control actions towards air pollution.

The group is now focussing its actions on marine pollution with its experience from the CLRTAP work. An operative model system is being elaborated to follow the fate of effluents to the sea as well as the atmospheric deposition to the sea surface in the Baltic and in the North Sea.

IVL

Gun Lövblad IVL

The working group on air and sea pollution

The main aim of the model is to be a ***tool for cost-effective abatement strategies***

The main issue so far for the marine model is

nutrient transports and effects.

However a model developed will also be of use for ***other substances*** such as chemicals.

POP/Chemicals require ***coordinated abatement of atmospheric emissions as well as marine effluents***. The combined experience of atmospheric and marine pollution is necessary.

The model also requires monitoring data for its validation.

IVL

Gun Lövblad IVL

The working group on air and sea pollution

The priorities of the group for the coming 2 - 4 years for POPs/chemicals are to support the basis for negotiations on a Nordic scale on the following topics:

- To identify sources and estimate input of POPs/chemicals in different physical-chemical forms, their transfer and exchange between atmosphere and sea, water and sediments as well as fluxes and concentrations in different medias.
- To find relationships between emissions, exposure and effects.
- To summarize and validate dose-response for single components and interacting effects.

IVL

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The working group on air and sea pollution

- To use biomarkers for biological effect studies on POPs and critical loads for mercury.
- To assess risks for marine biology by the presence of hazardous substances.
- To find methods for assessing the hazardousness of chemical
- To study the consequencies of existing recommendations and decisions.

IVL

Gun Lövblad IVL

The working group on air and sea pollution

The group reliazes that the present priorities are extensive and not possible to carry out with the present budget frames.

A strategy meeting is being held next spring to discuss:

- The focus of the group as regards POPs/chemicals for the international negotiations
- The cooperation with other NMR working groups in order to optimize the activities on a Nordic scale

As a basis for the meeting a strategy is to be elaborated on the further need of base material for cost-efficient control of large-scale environmental problems for the further activities of the group in their efforts to fulfil the goals set up for sustainable development in the Nordic Countries

IVL

Gun Lövblad IVL

The working group on air and sea pollution

Important aspects in the strategic work

- Effective communication between different levels of actors: scientists and decision makers.
- The timing has shown to be important. The scientific results must have reached a certain level before it may be the basis for decisions..

IVL

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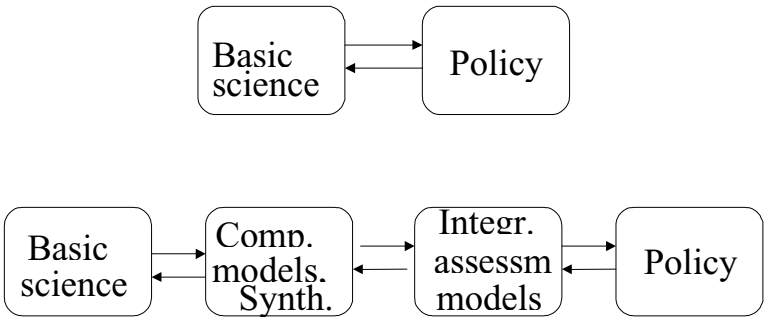
The working group on air and sea pollution



- **Figur 1** Samband mellan forskning och policy för ett miljöproblem i ett tidigt utvecklingsskede och i ett skede då kvantitativa samband är kända och utnyttjas.

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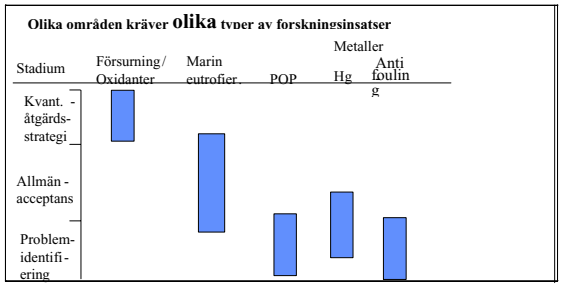
The working group on air and sea pollution

Olika miljöproblems mognadsgrad och därmed behov av underlag för internationella åtgärder.



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Contribution to Session 3:

Why Nordic cooperation? In what areas?
Views and experiences from regulators and the monitoring community.
Chair: Ola Glesne, Norway

Presentation No. 3:

Sharing the burden of chemical trace analysis

Roland Kallenborn, Norwegian Institute for Air Research

Within the past decade, significant improvements have been made world-wide in method development and sensitivity as well as instrument adaptation and hyphenation techniques for monitoring and determination of antropogenic contaminants in the environment. For trace-level determination of persistent pollutants, highly sophisticated sampling, clean-up, fractionation and quantification methods must be implemented in the analytical routines in a laboratory, requiring highly skilled personnel and laboratory installations. Thus, for trace analysis of the entire palette of 'new generation' environmental hazardous compounds, a huge battery of specially adapted highly sophisticated instruments and especially trained personnel must be provided to produce results with required quality. Therefore, such infrastructures are often by far too expensive and difficult to provide for just one laboratory. Thus, today, supported by the comprehensive international co-operations within trace analysis and monitoring of pollutants, laboratories tend to specialise on specific types of contaminants and co-operate within international project in order to produce reliable information on pollutant levels in the most effective and cost effective way. However, this type of linkage between laboratories has some inherent weaknesses like increased possibility of sample contamination during transport to the different laboratories, difficulties in harmonisation and quality assurance, reduced stimulus for further method development, limited access to sample material etc. The presentation will elucidate advantages and limitations of this concept. The implementation of specific national strategies will be assessed (e.g., specialised laboratories for each Nordic country) as adequate measures to strengthen advantages and minimise disadvantages. Several examples of inter-institutional co-operation within complex international projects will be used as examples. Special emphasis will be laid upon the already well established Nordic co-operation network.

Sharing the burden of chemical analysis

Advantages and drawbacks related to joint efforts in trace analysis

Roland Kallenborn

Norsk institutt for luftforskning

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General trends and background

- **Development of new sampling and clean-up methods:**
  1. **Sample specific adaptation**
  2. **Highly compound specific clean-up and sample preparation**
- **Development of new detection and quantification:**
  1. **New instrumentation and hyphenation techniques**
  2. **Increasing sensitivity and compound selectivity**
- **Consequences**
  1. **Highly skilled and educated personnel (technician, scientist) needed**
  2. **Costs are increasing "exponentially"**
  3. **Demanding QA/QC measures needed**

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General trends and background

cont.

- **Demands for optimized analytical methods for the 'new generation' of contaminants**
  1. **Complex sample preparation and fractionation techniques**
  2. **New, often unexpected, contamination sources**

- **Covering a broad spectrum of contaminant analysis in a large variety of sample matrices**
  1. **Coupling of sampling, preparation and clean-up techniques leading to highly efficient and time effective sample and extract handling**

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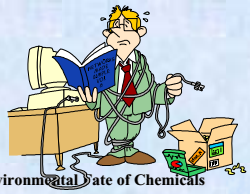
Today's situation

- **Trace analytical laboratories in Nordic countries are highly specialized (e.g. sample matrix, compounds, sample preparation, quantification methods).**
- **Co-operation exists between laboratories on the National and international (Nordic) level within joint projects (national funding bodies, Nordic Minister Council, EU, others)**
- **Co-operation is mainly based on direct personal and/or inter-institutional contacts**



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Today's situation *cont.*

- **Due to high demands related to analytical monitoring procedures, continuous method adaptations and optimizations are difficult, but highly needed.**
- **Analytical costs are usually the highest budget posts in larger monitoring and method development projects.**
- **Competitive structures are dominating.**

Consequences

- **Costs and time consuming procedures reduce the number of routinely monitored samples considerably**

ERGO: Ways should be found towards more effective and cost efficient trace analytical monitoring

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Possible scenarios envisaged

A. Compound specific specialization and "combined competence" between Nordic analytical laboratories

- **Advantage:** **cost-efficient co-operation**
  high-quality analysis
  complete QC/QA program

- **Disadvantage:** **Sample division and transfer can cause increased danger for unwanted contamination**
  Different preparation techniques often needed
  Difficult to co-ordinate between laboratories (logistics)
- **Possible consequences:** **Few compound specific specializations, but a large variety of sample types**
  Minor impulses for method development and implementation of new techniques

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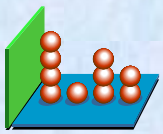
B. Matrix specific specialization and "combined competence" between Nordic analytical laboratories



- Advantage: Cost-efficient co-operation
  High-quality and specialized analysis
  Complete and competent QC/QA program
- Disadvantage: Sample transfer can cause increased danger for unwanted contamination
  Continuous method intercalibration needed.
  Demanding sampling and sample distribution
- Possible consequences: Broad contaminant spectrum covered for analysis for specific sample types
  Minor impulses for method development and implementation of other environmental sample types

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C. Nordic Topic Centers and National analytical networks

- Advantage: Cost-efficient co-operation between national co-ordination centers
  Inclusion of institutions with different specialization areas from an already existing large national/Nordic network
- Disadvantage: Demanding coordination of Nordic Topic centers on POP monitoring
  Continuous quality control and adjustments needed
- Possible consequences: Flexible response based on the needs of the respective monitoring task
  Criteria for member institutions for quality of analysis, co-operation and method development should be given

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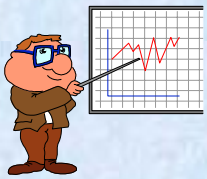
Evaluations

Basic criteria for effective and reliable contaminant monitoring:



- **Cost efficiency allows continuous monitoring of a large number of contaminants in the chosen sample types.**
- **All analytical methods employed are quality evaluated and considered as validated and reliable.**
- **The monitoring program reacts immediately after a new contaminant is detected and identified with the evaluation of environmental consequences and development of reliable quantification methods .**
- **Continuous adjustments and evaluations of the list of included compounds are carried out.**

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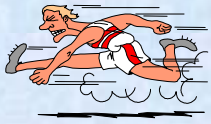
Conclusions and perspectives



- **More co-operation ("sharing the burden") between Nordic laboratories is needed.**
- **Flexible response based on the needs of the analytical co-operation program is important.**
- **A co-operation network of Nordic trace analytical laboratories would strengthen the Nordic monitoring.**
- **Monitoring programs should include method development and method adaptation in order to be able to respond quickly to new challenges and new contaminants.**

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Strengths and weaknesses in joint programmes.
The Danish experience.

National Environmental Research Institute (NERI)
Department of Environmental Chemistry
Bente A. Nyeland

In the national monitoring programme for the aquatic environment NOVA 2003 more than 250 organic and inorganic components in 17 different matrices have to be monitored and measured within a period of six years from 1998 to 2003. The components and matrices have been chosen due to national legislation and to international conventions and directives.

In order to secure the validity and comparability of results from NOVA 2003 produced by different environmental analytical laboratories a detailed quality control system was developed and used.

Initiated by Reference Laboratory for Xenobiotics placed in NERI a technical group of experienced analytical chemists was established. The group discussed and evaluated each component in each matrix of the NOVA 2003 programme in relation to lack of analytical methods and to the estimated detection limit.

In order to get information about the analytical quality of national and international laboratories involved in analysis of environmental samples a proficiency testing scheme was established. Based on the results from the proficiency testing schemes the Danish Environmental Protection Agency (DEPA) evaluated each participating laboratory and approved the most qualified laboratories for the NOVA 2003 programme. The demand for accreditation of the laboratories was considered but as the major part of substances was new in relation to development of analytical methods the demand for accreditation was decreased.

To assure that the analytical quality in the NOVA programme was of sufficient value during the period of sampling and measurement a specific and regular proficiency testing scheme was developed: NEXT 1998-2003. In agreement with the Danish Accreditation Body DANAK and with the DEPA the laboratories shall participate in the NEXT programme. The DEPA uses NEXT 2003 in a current evaluation of the analytical quality of the laboratories.

From the beginning of the period of the revised NOVA 2003 it was not possible to carry out analyses of all the components included in the programme due to the lack of analytical methods and the lack of knowledge of analytical quality. By now more than 230 of the components in the programme have been included in the analytical process with sufficient documented quality.

During the next two years the NOVA 2003 programme has to be revised. Among the activities which has to be considered is the introduction of new substances and matrices and how to assure that existing or newly developed methods are of sufficient quality. The question of the influence of the uncertainty from the sampling techniques compared to the total uncertainty of the analytical results has to be taken into consideration. If the classical theory of the documentation of analytical quality has to be used it will be an advantage if each result can be accompanied by the estimated random and systematic error. This has not been effectuated in the present programme.

As the European accreditation bodies plan to implement the ISO Guide 17025 for accreditation of analytical laboratories, in the future the laboratories are forced to use the theory of the expanded uncertainty in documentation of analytic quality instead the classical theory. In relation to coming monitoring and screening projects one should consider and implement this change in demands of documentation of the quality of the analytical result.

Workshop on Monitoring the Environmental fate of Chemicals
June 6-8 2001

Gaining from Nordic co-operation

Manuela Notter

We have known about environmental problems caused by hazardous and unhealthy chemicals for a long time. Companies, nations and international organisations have taken a wide range of measures to prevent impact on health and the environment. Generally speaking, very good results have been achieved for some metals and well-known organic compounds such as DDT, PCBs and to some extent also dioxin. Joint Nordic initiatives have helped in many ways. One example is the method developed for mapping heavy metals in mosses. This first showed a pressing need for measures and later on also the positive overall results of action taken.

Unfortunately, most of the work still remains to be done. For many substances, we do not know enough to make relevant risk assessments. This lack of knowledge extends to all areas: production, use and emissions as well as chemical properties related to bioaccumulation and persistence. In addition, new substances are constantly being produced and put to use. In recent years, it has become increasingly obvious that present action plans must be revised and new strategies developed. As we have heard over the last few days, work is also in progress in different countries and within international organisations. Examples include:

- New National objectives and strategies concerning chemicals
- The new Nordic Strategy for Sustainable Development, “new bearings for the Nordic countries”, as well as the new Nordic Environmental Action Plan
- The 6th Community Environmental Action Program (6th EAP) and strategy for chemicals

How can we proceed with the various lists of harmful substances set forth in EC directives and drawn up by other international bodies such as the OEDC, HELCOM, UN etc. The EU is running a project on substances presently in use. Substances are given special priority in relation to quantities produced and used (High Production Volume Chemicals, HPVC). The exposure assessment is often regarded as the weak part in the risk assessment and is to a large extent based on results from modelling. However, precedence is given to relevant monitoring data when available. Responsibility for compiling the data needed for risk assessment has been allocated between participating countries. The Nordic countries are responsible for a number of substances and an important question is how the Nordic countries can contribute with information on the state of the environment regarding HPVC:s and other priority substances for risk assessments.

Environmental aspects of chemical manufacture and use have global implications owing to international trade and the use of different products which, in combination with the chemical characteristics of each constituent, provide the basis for emission patterns. International initiatives are therefore needed to deal with the resulting problems. Strategic areas for joint action are:

- Development of strategies and information to be used when pressing for action in international negotiations and meeting commitments laid down by international conventions.
- Development of strategies and indicators and the compilation of data to monitor

compliance with obligations set forth in EC directives and international conventions (including environmental quality criteria as well as methods).

The new Nordic Environmental Action Plan sets both general and specific objectives for environmental improvements on chemicals, identifies action to be taken and states the results to be achieved within four years.

General objectives for chemicals:

- The use of chemicals must not entail any risk of negative impacts on human health and environment, and discharges of chemicals constituting a threat to human health and the environment must be discontinued within one generation (25 years).
- Reducing negative impacts on the environment and public health from production and consumption of goods and services throughout their life cycles, as well as promoting efficient use of resources.
- To improve information on Nordic nature and environmental co-operation for general public and for the authorities in the Nordic countries, and to contribute to improving preconditions for stronger commitment and intensified environmental awareness. Also, to contribute to widespread utilisation of co-operation results throughout the Nordic region.

Here we face a major challenge. Achievement of these objectives will require concentrated united action. This increases the need for better co-ordination between the various actors. Nordic co-operation takes place on a voluntary basis and one of its central aims is to achieve benefits within the Nordic region (Nordic advantages). As with all joint efforts, mutual trust and the conviction that we stand stronger together than alone are crucial if united action is to be meaningful, produce results and thereby be allocated resources and gain status and influence.

If the results of joint Nordic initiatives are to be realised and yield substantial results, earlier experience has shown that it is important that:

- The initiatives have broad support among political decision making bodies and government administrations and are in harmony with ongoing work by relevant authorities and other actors.
- The Nordic countries possess a high level of competence and enjoy a good international reputation

Over the past few days, we have identified areas suitable for united action where success can be achieved by becoming more comprehensive, giving quicker answers and by achieving a greater international impact. The following offer scope in this area.

- Increasing sectoral responsibility by making information more readily available to trade and industry as well as the general public.
- Improving our knowledge about chemicals and our skills and methods for analysing them.
- Identifying sensitive matrices relevant to Nordic conditions and developing cost-effective methods for these matrices.
- Developing a system of biological test methods for integrated monitoring in Nordic countries.
- Compilation of data needed for risk assessments.
- Increasing the flow of information to politicians, actors in the market and pressure groups such as NGOs and the general public.

The discussions of the last few days have shown that there is much to be done but that by co-operating, prioritising carefully selected areas and formulating effective strategies for establishing the work internationally as well as in each Nordic country, we will be able to make real progress.