

REPORT SNO 4164-2000

**Surveillance of Water
Quality in the Songhua
River System in
Heilongjiang Province,
P.R. of China, CHN 017**

Consolidated Summary Report of
NIVA's mission to Harbin
April 1999



Norwegian Institute for Water Research

REPORT

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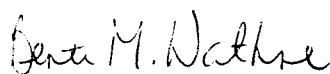
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Abstract

This report describes the activities taking place under NIVA's mission to Harbin, Heilongjiang in April 1999 on the project "Surveillance of Water Quality in the Songhua River System in Heilongjiang Province, P.R. of China". The report consists of five main parts; a general section, project management, data collection, training and ENSIS installation and a summary report on instrument installation. More detailed information from the project activities and discussions is given in Annex 1-8.

4 keywords, Norwegian	4 keywords, English
1. ENSIS	1. ENSIS
2. Overvåking	2. Surveillance
3. Vassdrag	3. Water system
4. Vannressursforvaltning	4. Water Resources Management



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Consolidated Summary Report of NIVA's mission in Harbin April 1999.

This reports consists of five parts, namely:

- Introduction
- 1. Project management
- 2. Data collection
- 3. Training and ENSIS Installation
- 4. Summary Report on Instrument Installation

Detailed and further information from the different activities is gathered in Annex 1-8.

Introduction

1 Participation

HEPB/HECMS

Mr Li Weixiang

Mr Guo Yuan

Mr Li Ping

Ms Chen Aifeng

Mr Dong Xianfeng

Mr Chen Jiahou

Ms Wu Yuehui

Mr Chen Yong

Mr Li Jiming

Mr Chen Xiaobin

Mr Jiang Bo

Ms Qu Moli

Ms Li Fen

Mr Zhao Wenkui

NIVA

Ms Bente Wathne

Mr Stig A. Borgvang

Ms Kjersti Dagestad

Mr Tor Haakon Bakken

NORGIT

Mr Torstein Skancke

Mr Audun Grotterød

2 Opening

Mr Li Weixiang opened the Workshop and welcomed the Norwegian project partners to Harbin. The agenda of the Workshop was approved (Annex 1).

3 Working procedure

Due to the variety of tasks to be performed during the Workshop and the limited number of days available, NIVA suggested to divide the work and participants into three groups (see also Programme at Annex 1), which would work in parallel according to distinct issues, namely:

- Project management
- Data collection
- Training and ENSIS Installation

This proposal was accepted by HEPB. The three groups have different minutes as follows in this report.

Installation of the water quality monitoring instruments, start up and training with the instruments were activities running in parallel with the working group discussions in Harbin. A Summary Report from these activities is also given here.

1. **Project Management**

1.1 **Annual Report discussions**

Main Events of the Heilongjiang Project in 1998

The 1998 Annual Report was used as basis for the discussions, and the following topics were considered in detail:

1. **Data transfer.** Due to the economic burden of running an internet transfer between the server and clients at HECMS, and between the clients and HEPB there are no plans for on-line transfer of data between the two institutions. HEPB must have a separate ENSIS server/client installed where data collected from online monitoring stations and historical data can be used by HEPB and its customers. Two extra days of work are needed for NORGIT for the installation of the replication of the database at HEPB. The installation of the replication will be accomplished after the learning process is finished, and the Chinese experts are capable of operating the ENSIS system.
2. **Maps.** Maps for the Mudanjiang catchment and for the whole Heilongjiang Province in digitised form are currently available in scale 1: 1000 000 only. It was agreed that there is need for a more detailed maps and detailed information to fulfil the objectives of the project. HEPB promised to do their best for providing the necessary information. During a visit to Mudanjiang, Mr. Stig A. Borgvang was shown more detailed maps of the area. These maps are needed for the project work. The Chinese side pointed out that there are two problems with providing more detailed maps, i.e. the cost may be high and security issues may become a problem.
3. **Chinese version of ENSIS.** A Chinese language version of ENSIS will be one of the products of the project work. In case there is a change from English to Chinese ENSIS version at this stage of the project, support from Norwegian experts will become difficult. It was therefore agreed to change to a Chinese language version as late as possible in the project development. However, the necessary translation work of the text will start as soon as possible to prepare for the language change. The project group in Harbin will receive a list of the necessary words for translation, and will start the translation as soon as the details of the work and the expenses have been agreed.
4. **Data collection.** The status of data collection will be evaluated in more detail in the ENSIS-WATERQUIS/water quality and abatement strategy group discussions.

ADACS. NORGIT explained that they have been working intensively on the ADACS throughout 1998.

5. **Hardware.** In stead of buying a 36" screen, a projector that is more efficient for presentation purposes have been purchased. There will be no prescribed WAN for transfer of data between the two server/client and client at HECMS and HEPB built at this stage, although two CISCO boxes have been bought. The separate ENSIS server/client enables HEPB to use data collected from online monitoring stations as well as historical data. This is a different technical solution for the set-up than planned originally. HEPB will not use the WAN or Internet solution, but a more simple solution. One server and eight workstations have been installed. The Norwegian side agreed to such changes, although, originally, one server and two workstations were originally planned to be installed. After this change, the Norwegian experts suggest that the two Cisco boxes should be returned to the supplier. This needs to be discussed with experts from both sides

Revised Summary Work Plan

6. **Phase 3.** In addition to the programme described, it will probably be necessary to organise a visit for training and project discussions when Phase 3 is initiated in June 1999. Continuity of personnel for training in ENSIS is important. The personnel sent to Norway for training should be the basic personnel for further training in China, and the tutorial plans prepared for each training session will be developed on the basis of knowledge already transferred. For capacity building purposes also, the basic personnel will be important to ensure necessary progress.
7. **Project extensions.** As a part of the Work plan for Phase 2 and phase 3 in 1999, there will be an evaluation of the current monitoring system and of possible needs for extensions. During Phase 3 plans will be made for extensions of the water monitoring and surveillance programme and for an integrated strategy for optimal water pollution abatement in the Songhuajiang River system. An agreement has been made to incorporate an Air Quality Surveillance and Information system for Harbin and, possibly, for the entire Heilongjiang Province in the future co-operation project. This will be discussed soon.
8. Two new topics were also mentioned for incorporation in the new plans, namely emergency handling procedures and analysis of organic micro pollutants. A dissemination part will be important in an extended co-operation, with HEPB as centre for ENSIS in Northern China. It is unclear whether a new project/project extension is best handled through the SEPA system or through MOST.
9. Both parties agreed to ask advice before they indicate their preferred choice. It is hoped that a complete new project proposal, including all above-mentioned aspects, will be submitted to both Chinese (MOST or SEPA) and Norwegian (NORAD) authorities concerned. It was also agreed that both sides will try to start the new project as soon as possible, possibly by implementing it in parallel with the existing work. This would save both time and budget. However, the feasibility of obtaining an extended or new project depends on a successful progress of the running project, according to plans.

Project costs in 1998

10. HEPB explained that they have had questions from MOST concerning how the accounts for 1998 had been calculated and presented. This means that it may be necessary to make some changes to the account procedures compared to the way the accounts were presented in the 1998 Annual Report.

Work Plan and Budget for 1999

11. **Visit to Harbin in June/August.** In addition to the issues in the work plan and time schedule given in the Annual Report, it may be necessary to include an additional short visit for in Harbin by the Norwegian side for training and project follow up in June 1999. The exact time of the visit will depend on the progress in the training process of ENSIS.
12. **Budget for 1999.** It was acknowledged that there was a need for an agreed budget within the budget frames given by NORAD. The Chinese side agreed to prepare their budget that will be allocated from NORAD to MOST for 1999 within the budget frame of NOK 490.000. It is clear that the total budget for the project is decided as both SSTC and NORAD have signed. The budgets allocated for both sides have also been decided.

13. **Intercalibration.** NIVA explained in more detail about the suggested plans for the intercalibration work in 1999. It is suggested that the Chinese institutions in Harbin and Yantai join an international intercalibration exercise run by NIVA. This is under the auspices of UN and the Agreement for Long-Range Transported Air Pollution. Most European countries participate in this intercalibration, together with laboratories from the US. The laboratories in Harbin and Yantai will then be the first Asian laboratories to join this intercalibration, if they decide to participate. A specially designed part will be added to the intercalibration work for the Chinese projects to participate in this intercalibration exercise. By participating in such an internationally agreed intercalibration, this will reduce the necessary budget to the minimum of NOK 20.000, for the Norwegian side in 1999.

1.2 Project Extensions

Tuesday 20 April, was used for more detailed discussions of possible project extensions and further project co-operation.

Extensions of the current project on water surveillance and monitoring

1. This project, covering surveillance of such a large river system, is the only project in the whole of China of its kind, and therefore will be a model for the whole country, if it is successful.
2. Possible project extensions include analysis of organic micro pollutants and emergency handling procedures, in addition to abatement strategy issues and further development of the modelling work. The model will be applied firstly for the Mudanjiang catchment, then for the whole province. It was pointed out that dissemination of achieved results is important.
3. Organic pollutants represent a problem for almost all rivers in China, and the analytical work suggested in the proposal may become a model for other rivers and areas on how to control organic pollutants. The Jilin province, with its chemical industry, is an important source of organic micro pollutants in the Songhuajiang River system. Improving the analytical capacity of the HEMC will be important. In that respect, it may be possible to transfer knowledge about analytical aspects by sending students to Norway and Norwegian analytical trained persons to Harbin. NIVA will contact the Norwegian State Pollution Control Authorities (SFT) in order to try include institutional building on these matters into the project. Furthermore, it is proposed to include knowledge transfer about accidents and oil spill prevention and handling issues in the project. Both sides have also discussed the possibility of sending Chinese personnel to work for some time in Norway (NIVA, NILU, or NORGIT). Such a person may act as a co-ordinator who can assist in the co-operation work on both sides.

Air quality surveillance and monitoring

4. An air quality surveillance and monitoring project is, as far as we know, not carried out for a whole province or region in China. This may be the first project of this kind, and may be used as a model for others.
5. The NILU/NORGIT proposal from 1997 puts more weight on the modelling work than the Chinese proposal from 1998. A surveillance programme may be performed much more efficiently by use of a dispersion model, saving money on the equipment side. The

original Chinese plan contains 27 stations and 7 mobile stations, but by efficient use of models these numbers may be reduced significantly. Equipment is provided from Japan (second hand, wet chemical methods), but this is not the most up-to-date equipment and the number is insufficient for the present monitoring work. The new concept from the Chinese side, to cover the whole province for air quality monitoring and surveillance, was agreed. This concept should be followed up by NILU. The new concept of this proposal is to extend the project to cover 4 cities, and included one mobile station.

6. SEPA-regulations for air monitoring advise that, for an area, there should be at least a certain number of monitoring stations for each 1 million Inhabitants. In addition, for each city, there shall be one background station. Harbin has 6 million inhabitants, and should therefore have six stations for monitoring air quality and one background station. Before 1996, monitoring of air quality was performed only during 5 days every 3 months, using manual methods. It is now required by SEPA to make a report once a week. This manual approach can support a dispersion model approach, as stated in paragraph 4.

General comments to further co-operation

7. The north of China is considered as the underdeveloped part of China. The economic situation is difficult, compared to other parts of China. The possibility for HEPB to become an agent for SEPA should be further developed by the Chinese partners. At national level, the project has been given high interest by SEPA and the national monitoring centre.
8. The NORAD policy for supporting equipment to China will be realised through loans. Then loans are needed to make a full monitoring system. Only necessary equipment for establishing a system is normally given as a grant. An extensive monitoring system, with many stations, will have to be financed differently. NORAD gives priority to transfer of knowledge, and supports only equipment to a certain extent to allow transfer of knowledge in an optimal way.
9. Mapping can be a granted part of the extensions of the project. NORGIT can possibly provide better maps through satellite pictures (spot satellite).
10. Emergency, accidents and leakage of pesticides and toxic chemicals, may be connected to ENSIS in some way, because the models for dispersion in air and water may be used. NIVA will contact SFT to discuss possibilities for co-operation in this field.
11. The further co-operation may be divided into three parts:
 - a. Air Part, (new project)
 - b. Capacity building/institutional building and
 - c. Extension of the water part.

If the priority has to be given to these tasks, the Chinese side's priorities are as follows:

For the water part:

- a. Mudanjiang area, extension of monitoring capacity.
- b. Organic pollutant monitoring
- c. Other extensions of ENSIS WaterQuis.

The Air project, as a new part, should be given priority.

12. The Chinese side favours an Air project for four cities, including one mobile station, with the possibility of adding more equipment at a later stage. At this first stage the automatic stations may be combined with manual stations to satisfy the need for surveillance.

Training in the four cities for surveillance of air quality will be a part of the project. Dissemination of the activities already finished through the existing project will also be possible through this part of the extended project.

13. It was agreed that a visit/stay of a Chinese expert in Norway for some months would be of benefit for the co-operation. The Norwegian side promised to investigate the possibilities for a Chinese expert of receiving a grant for such a stay. It has been mentioned that the interests on the money made available for the project may be available for financing the stay.

Harbin 21 April

Mr. Guo Yuan

Ms. Bente M. Wathne

The original Minutes from this part of the Workshop is signed and shown in Annex 8.

2. Data Collection

2.1 Introduction and goal for the data collection

- 2.1.1 During the Workshop in Norway, NIVA and HEPB made a thorough review of the data requirements, considering both data already available (see Annex 2, section 2) and listing remaining 'data groups' to be supplied by HEPB. The data collection concerns both the data collected for the purpose of the implementation of ENSIS and the sub-project on Abatement Strategy. Concerning the latter, it was agreed to concentrate on the Mudanjiang catchment area, as a case study for the Songhua River catchment.
- 2.1.2 Furthermore, during the Workshop in Oslo, HEPB agreed to supply data by 15 March 1999 on Industrial Activities and on Municipal Wastewater, according to agreed notification forms (see Annex 3).
- 2.1.3 The report from the meeting in Mudanjiang is included in this Workshop Report as at Annex 4.

2.2 Overall conclusions

- 2.2.1 HEPB has not been able to follow-up the agreements from the Workshop in Oslo in January 1999 because there were problems understanding the forms agreed upon in Oslo, both as regards industry and municipal wastewater.
- 2.2.2 There is currently no wastewater treatment plant in the Mudanjiang catchment, but one plant is planned construction.¹
- 2.2.3 For wastewater (treatment area section of the notification form), in the first instance, information should be provided on:
- Name of town/municipality: The Mudanjiang district needs to be divided into the lowest level of administrative areas.
 - Total number of people in the town/municipality
- 2.2.4 For the remaining columns in the notification form (number of people in drainage area to discharge pipe and number of people connected to sewerage in the same area), information may only be provided for the urban areas. NIVA stressed the fact that the more outlet locations and connection numbers that are known, the better quantification estimates of the nutrient load from the population and the industrial sanitary water. Secondly HEPB/HEMC should provide:
- A division of the municipalities/towns in sub areas representing the drainage areas to discharge pipes (the discharge pipes/outlets can be "fictive" only, symbolising the outlet from and area).

¹ HEPB will inform NIVA about any other existing or planned waste water treatment plant in the Songhua river catchment

- The number of people in drainage area to the sub area discharge pipes and the number of people connected to sewerage in the same area.
 - Based on ENSIS, a map copy (digital) with the Mudanjiang district divided into town/municipalities and, if possible, sub-areas under the town/municipalities.
- 2.2.5 For industrial activities most of the data can be supplied according to the notification form.
- 2.2.6 There are two main purposes of the sub-project on abatement strategy:
- one is procedural and NIVA will endeavour to develop a manual for later use in other areas/catchments
 - one is result oriented and is applied to the specific catchment of the Mudanjiang river system

2.3 Agreements

Additional data requirements were agreed upon, as follows:

- HEPB agreed to send data about Industrial activities to NIVA by 1 June 1999 (see section 2.2.5). The data should be provided according to the format agreed upon during the training in Oslo in January 1999 (see Annex 3).
- HEPB agreed to send data about Treatment Areas to NIVA by 1 June 1999. The data should be provided according to the format agreed upon during the training in Oslo in January 1999 (see Annex 3). See also description in section 2.2.
- HEPB agreed to submit a 'population pattern map' by 1 June 1999
- HEPB will try to find a population forecast for the Mudanjiang river catchment
- HEPB will also try to provide information about the quantity of cadmium in chemical fertiliser used in the Mudanjiang river catchment
- HEPB will provide information about the different types of crops and their geographical distribution in the Mudanjiang river catchment
- HEPB will provide information about the soil types in the Mudanjiang river catchment
- HEPB will provide information about monthly precipitation, both quantitative and qualitative in the Mudanjiang river catchment
- HEPB will provide a description of measures already implemented or applied in the Mudanjiang river catchment

3. Training and ENSIS Installation

3.1 Introduction and goal for the training

The goals for the training during the current Workshop were twofold, namely:

- to build further on the topics covered in Oslo in January 1999, i.e. to base the training on the acquired knowledge from the two week long Oslo course
- to install an updated version of the ENSIS application, the ADACS application and an updated project file with the new data entered by NIVA.

3.2 Overall conclusions

The day-to-day summary is at Annex 5; a summary of the programme is listed in Annex 1. This section provides a brief summary of the main conclusions:

- For practical reasons, it was necessary to adjust the original programme for the training session
- It is suggested to cover the training on UDB, ADACS, advanced use of pollution sources and further use of ENSIS in an extra training session in August/September 1999. The justification of a changed training programme and the proposed way forward due to the postponement are listed in the table in Annex 5
- ADACS was installed successfully, but the telecommunication connection to the instruments could not be established. The problems appear to be due to disturbance on the lines. NORGIT will provide a description of problems discovered and work with HEPB/HEMC in order to solve the problem.
- Due to the problems with ENSIS, NIVA trained the future Chinese ENSIS operators in how to import the data into ENSIS from the data loggers, with help of the AC logger programme
- The prioritising of in-depth knowledge on fewer items gave a better result than trying to cover several themes superficially. It is important that the Chinese ENSIS operators know how to operate the system in detail. They must therefore practice in the topics dealt with during in this training session on a continuous basis up to the forthcoming training session in August/September 1999. The Chinese ENSIS operators appear to learn quickly and a good command of operating the system.
- HEPB provided NIVA with digitised maps (on tape) in scale 1: 100 0000 (readable on UNIX machines only). They encompass thirteen different layers, such as distribution of water bodies, railway net. However, the legends are currently in Chinese only, but HEPB undertook to provide a translation into English.
- It was decided to start the conversion of the FoxPro database into ENSIS formats. NIVA explained how this should be done.
- It was decided that NIVA should work further on the database, and that HEPB/HEMC keeps a copy for training purposes.

3.3 Agreements

The table below lists the agreed follow-up actions as an outcome of the Training in Harbin 19-23 April 1999

Issues	Deadlines	HEPB/ HEMC	NIVA/ NORGIT
Digital and paper copy of the ENSIS User Manual to be sent to HEPB with a description of which sections to translate	1 June		NIVA
To maintain regular contact with HEPB/HEMC in order to ensure that the telecommunication functions properly	Continuous		NORGIT
To provide a summary of how ADACS was tested in China and why the ADACS application did not work properly.	15 May		NORGIT
To implement the necessary functionality to make ADACS operational at HEMC	1 July		NORGIT
To supply the ADACS User Manual in English	1 July		NORGIT
To supply NIVA with the agreed data (see data collection programme)	1 June	X	
To enter the supplied additional data into ENSIS	1 June		NIVA
To improve the ENSIS maps (whenever available) ²	1 July		NORGIT
To use the acquired knowledge about ENSIS for training purposes.	Continuous	X	
To provide a translation into English of the legends for the maps on the tape.	1. June	X	
To convert the monitoring data stored in FoxPro to ENSIS formats (according to the description given at the training) in order to be able to import the data in the ENSIS database during the next training. ³ The FoxPro data should be prepared in accordance with the requirements in Annex 6. Furthermore, Annex 7 describes, stepwise, the import procedure for entering monitoring data into ENSIS.	1 August	X	
NIVA to work further on the project database; HEMC keeps a copy for training purposes	until next training session		NIVA

² NORGIT will examine the map received on tape and assess which parts can be imported into ENSIS.

³ As much as possible should be converted; HEPB/HEMC will decide what is feasible.

4. Summary Report on Instrument Installation

12-23 April 1999

4.1 Background

The equipment was ordered by the Chinese partners through NAN HANG Instruments Inc. The shipment was stored from November 1998 until 12 April 1999 at the HEMC premises. The shipment was unpacked and distributed to the various monitoring sites at HEMC.

4.2 Purpose of the mission

NIVA's tasks were as follows:

- Installation of the equipment
- Start-up
- Training

4.3 Site installations

4.3.1 General preparation

It had been agreed that the Chinese partners at the various sites should have made some general preparations before the arrival of the NIVA installation staff. This encompasses:

- Heated facilities, i.e. warmer than +10°C
- Filtrated sample water
- Tap water for automatic cleaning
- Oil-free compressed air
- Dedicated telephone line with lightning protection
- Stabilised 220 V AC for instrumentation purposes
- Effluent drains

The lightning protection was supplied by the NIVA installation team.

4.3.2 Harbin waterplant

Site preparation

Most of the preparations were done by the time of the arrival of NIVA staff, with the exception of the oil-free compressed air for automatic cleaning purposes. However, the problem was solved rapidly by installing a compressed nitrogen tank.

Instrumentation

Complete monitoring station, i.e.:

- Turbidity meter
- Oxygen meter
- pH-meter
- Conductivity meter with temperature output
- Nitrate analyser
- Ammonia analyser (one of the electrodes does not function and should be replaced by the Chinese trader)
- COD analyser (to be installed by the trader)
- Data logger with modem

Installation

The installation was accomplished in two days. At this particular site, the installation was more time consuming both because it was the first installation and because personnel from all monitoring sites were present.

Training

The training was performed during the installation

Assessment

The sample water supply is critical because of low pressure tolerance in the flexible tubing. The tubes should therefore be replaced by tubes designed for pressure above 4 kg/cm². Furthermore there is concern about the effluent handling which currently implies manual running of the drainage pump.

4.3.3 Qiqihar waterplant

Site preparation

The site preparation was perfect.

Instrumentation

Complete monitoring station, i.e.:

- Turbidity meter
- Oxygen meter
- pH-meter
- Conductivity meter with temperature output
- Nitrate analyser
- Ammonia analyser
- COD analyser (to be installed by the trader)
- Data logger with modem

Installation

The installation went smoothly with enthusiastic contributions of the local staff.

Training

The training was performed during the installation.

Assessment

The temperature device in the conductivity meter probe did not function. The trader must replace the probe.

4.3.4 Mudanjiang waterplant

Site preparation

The site preparation was perfect.

Instrumentation

The instrumentation consists of:

- Turbidity meter
- Oxygen meter
- pH-meter

- Conductivity meter with temperature output
- Ammonia analyser
- Data logger with modem

Installation

The installation went smoothly with enthusiastic contributions of the local staff.

Training

The training was performed during the installation.

Assessment

The voltage stabiliser was available, but not installed. The sample water supply pressure was insufficient during the installation. Therefore, the installation had to be performed by using tap water.

4.3.5 Jamusi Powerplant

Site preparation

The site preparation was incomplete. The following problems resulted in a complicated installation:

The physical placement of the instruments is currently unsatisfactory, i.e. the instruments are mounted more than 3 meters above the present floor level.

There was no tap water.

The 220 V AC supply fails to meet any standard.

The instruments were covered by a considerable layer of dust that will inevitably cause instrument failure.

Instrumentation

The instrumentation consists of:

- Turbidity meter
- Oxygen meter
- pH-meter
- Conductivity meter with temperature output
- Ammonia analyser
- Data logger with modem

Installation

The installation was completed in spite of risk of personal injury to involved personnel. The equipment is currently installed, but cannot function properly until the grounding wires can be connected (see *Site preparation* under 4.3.5).

Training

The training was performed under difficult conditions.

Assessment

NIVA is concerned about the appropriateness of the location and the lack of resources allocated by the plant management.

4.4 Overall assessment

NIVA is confident that three of the four monitoring sites will function properly. The turbidity meters at all sites should be recalibrated.

The Chinese trader should:

- provide the formazine standard and user manual in English or Chinese as soon as possible
- urgently ask POLYMETRON to supply the necessary software to enable the oxygen meter to be operated down to 0° C.

NIVA should provide figures for automatic calibration of low level concentrations of ammonia and nitrate.

NIVA would like to thank relevant HEPB staff for their support during the installation process. This enabled an efficient handling of installation details and travel arrangements.

Harbin, Heilongjiang, People's Republic of China

22 April 1999

Signed by:

Mr Arne Veidel

Mr Morten Willbergh

Schedule for Equipment Installation

Date	Place	Activity	Persons
April 12	Harbin Airport	Meeting Mr. Arne Veidel and Mr. Morten Willbergh	Mr. Dong Xianfeng(HEPB) Mr.Chen Jiahou(HEMCS) Mr. Hou Mingxu(Harbin) Mr.Liu Wan Yuan(Qiqihar) Mr. Sun Zimeng(Mudanjiang) Mr. Wang Jijian(Jiamusi)
April 13	HEMCS	Checking the equipment	Norwegian experts
	Site in Harbin	Installation and training	Equipment sellers
		Activities arranged by municipal EPB	Trainees
April 14	Harbin	Same as yesterday	Same as yesterday
April 15	Harbin	Same as yesterday Trainee back to their cities with the equipment	Same as above
April 16—22		Installation and adjustment	Arranged by the local EPB
April 23	Harbin Airport	Leaving for Beijing	Mr. Dong Xianfeng Mr. Chen Jiahou

Annex 1: Day-to-day programme

Day	Objective
Monday 19.04	<ul style="list-style-type: none"> • Welcome and programme overview
	<ul style="list-style-type: none"> • Data requirements-status • Chinese experience so far with the use of ENSIS. • Finances and planning
	<ul style="list-style-type: none"> • Technical configuration and installation of new version of ENSIS and dump files.
Tuesday 20.04	<ul style="list-style-type: none"> • Presentation of the main function of the ENSIS application
	<ul style="list-style-type: none"> • Comprehensive use of the GIS part of ENSIS
	<ul style="list-style-type: none"> • Finances and planning
	<ul style="list-style-type: none"> • Visit in Mudanjiang
Wednesday 21.04	<ul style="list-style-type: none"> • Cont'd: Presentation of the main function of the ENSIS application. • Preparation of the Summary Report • Detailed presentation of and training in the monitoring database
Thursday 22.04	<ul style="list-style-type: none"> • Manual entering and Import of pollution sources with focus on the Mudanjiang river catchment
	<ul style="list-style-type: none"> • Cont'd: Detailed presentation of and training in the ENSIS monitoring database
	<ul style="list-style-type: none"> • Preparation of the Summary Report
	<ul style="list-style-type: none"> • Training in the AAC data logger programme
	<ul style="list-style-type: none"> • Procedures for import of data into ENSIS
Friday 23.04	<ul style="list-style-type: none"> • Any remaining issues • Remaining training: Import of data from automatic sampling. • Discussion and suggestion of how to convert the FoxPro monitoring data into ENSIS format. • Discussion of the draft Summary Report and the further work programme

Annex 2: Data collection part of the mission

1. Further details about municipal wastewater

More detailed information related to data collection and municipal wastewater:

- The Mudanjiang urban area has a sewerage system, but outside the urban areas, there is mostly no piping system
- It appears that there is no current practice in China as regards production coefficients for nutrients. European figures will therefore be applied. Suggested values are:

N: 12.5 g /person/day

P⁴: 1.7-2.5 g/person/day

2. Details related to monitoring activities in the Mudanjiang catchment

- 1995 was a typical year as regards the quantity of precipitation and volume of flow
- There are two hydrological stations in the Mudanjiang river
- Monitoring data may also be supplied for the year 1996
- There are five 'biomonitoring stations' that are monitored twice a year
- The goals for user interests are set by HEPB and thereafter approved by the Heilongjiang government. For the Mudanjiang river, it is currently categorised as class 2 in the upper part, class 3 in the middle part and class 4 in the lower part
- There is no information about the application of manure applied. The animal density (animal units per area) will therefor be used
- 'European figures' for run-off coefficients per crop type will be applied
- As regards measures already implemented to reduce the pollution load into the Mudanjiang river, a Fertilisation Control Plan is being applied and measures have been implemented related to small factories (shut down)

⁴ Will depend on the extent of the use of P-containing detergents

2. Status of data collected 'outside ENSIS' by April 99

Type of data	Year-period	Comments	Area
Biomonitoring data of Nen river	Flooding season 1996	Invertebrates Biomass-species	Nen river
Land-cover data	1995	Concerns forest and grassland cover given in km ² and %	11 administrative districts
Land-cover data	1995	Total area, farm land and urban area	11 administrative districts
Monthly average flow volume	1995	Unit: m ³ /	Nen river, Songhua river (2-3 sites) and Mudanjiang river
Basic information about the Songhua River	1995	Volume of flow (range), velocity of flow, width and depth	Songhua river 3 sites, Nen river and Mudanjiang river
Small maps: User interests	1995	Legend missing (colour coding)	Whole catchment in flooding and dry seasons
"Collection and reserve of Environmental Water sample"	General description	Collection procedures, preservation of samples, according to parameter, QA of analysis	Heilongjiang
Water quality criteria and water quality goals	General description		China
"Water quality status from synchronous monitoring in the Songhua river basin"	General description/characteristics	River basin, monitoring, water quality status	Various sites in the catchment
Population in the catchment	1995	Per town and country	11 administrative districts
Fertiliser use (sale statistics) in the catchment Relates to inorganic fertiliser	1995	N-fertiliser, P-fertiliser, K-fertiliser and compound (mixture) fertiliser in tonnes	11 administrative districts
"Cultivate areas of farmland"	1995	Farmland cover per crop (nine types + 'rest'), given in km ²	11 administrative districts
Domestic animals	1995	Cattle, horse, donkey, mule, pig, sheep and cows	11 administrative districts

Annex 3: Notification forms regarding Industrial Activities and Municipal Wastewater

Wastewater treatment area

When there are no measurements, theoretical discharge factors, in combination with population numbers, should be used to calculate the domestic wastewater data.

Data name	Name of town/municipality (0)	Total Number of persons in the Town/municipality (1)	Total Number of Persons in the drainage area to the discharge pipe (2)	Total Number of persons <u>connected</u> to the indicated Discharge pipe (3)	Total Numbers of persons <u>not</u> connected to the indicated Discharge pipe (4)	Name of discharge pipe (5)	Maps: If possible, draw the treatment area/municipal sub area for each discharge pipe on a map. (6)
Example	Yantai	100 000	70 000	30.000	40.000	Yantai WWTP Discharge pipe 1	
		100 000	30 000	10 000	20.000	Yantai WWTP Discharge pipe 2	

- (0) Use the smallest units defined in your ENSIS project
- (1) Indicate the population of the district town
- (2) Indicate the number of persons living within the drainage area to the discharge pipe (alternatively the size of the area draining to the discharge pipe compared to the area of the whole district). **NB The drainage area to the discharge pipes can be sub areas of the municipalities/town (=treatment area)**
- (3) Indicate the number of people in the drainage area to the pipe that are connected to the discharge pipe
- (4) Indicate the number of people in the drainage area to the pipe that are not connected to the pipe (by difference)
- (5) Indicate the name of the discharge pipe listed under the municipal waste water treatment plant
- (6) The treatment area should be provided on a map. This could be done by using the ENSIS system and paste the picture in a Word file.

Industry

Data name	ID of Industry	Name of industry	Administrative region	Main product	Volume of main product	Line of Business (2)
Example		Yantai Metal Plating Factory	Fushan	Galvanised metal plates	500 tonnes per year	Metal plating

Table cont'd:

Name of discharge pipe (3)	Eastern co-ordinate (4)	Northern co-ordinate (4)	Height above sea level	Discharge depth (5)	The discharge pipe discharges to (6):	Measured parameters at outlet (7)
Yantai Metal Plating Factory Discharge Pipe 1	19500	18515	22	3	Lake Mashui	Cd, Pb, Flow
Yantai Metal Plating Factory Discharge Pipe-2	19525	18523	25	0	Net node 1 Yantai/ Yantai WWTP	NTOT, PTOT, Flow

- (1) The industry should be classified in type of industry (=line of business), according to the predefined list in ENSIS (see enclosure).
- (2) If two or more discharge pipes are from the same industrial plant, the information should be entered under each other in the column. The discharge pipes has to be named the following way: <Industry name>_Discharge pipe<number>. See example above.
- (3) The co-ordinate system used should be the same as the co-ordinate system on your installed version of ENSIS. You find the co-ordinates by pointing to the location with the use of GIS.
- (4) This is the depth below the average level of the recipient.
- (5) This may be a lake, a river node or a net node. If the net node is selected you should ensure that the co-ordinates are identical to those of the outlet of the discharge pipe.
- (6) This column should comprise the parameters measured at the outlet of the discharge pipe. The measurement information should be structured column-wise, and should contain the data as shown in the table below

Data	Discharge Pipe	Parameter	Medium	Sampling method	Date and time	Value	Unit
Example	Yantai Metal Plating Factory Discharge Pipe 1	PTOT in the outlet from the plant	Outlet from the plant	Grab sample	11.06.98 08.00.00	10	ug/l
	Yantai Metal Plating Factory Discharge Pipe 1	PTOT in Outlet from Industry	Outlet from Industry	Grab sample	22.10.98 08.00.00	12	ug/l
	Yantai Metal Plating Factory Discharge Pipe 1	PTOT in Outlet from Industry	Outlet from Industry	Grab sample	21.12.98 08.00.00	8	ug/l

Line of business (parent)

- Industry Metal Plating and Surface Finishing
- Industry Iron and Steel
- Industry Smelting
- Industry Aluminium

Industry Construction and Demolition

- Industry Electric Utilities/Electric circuit Industries
- Industry Petroleum Exploration and Refining
- Industry Pharmaceuticals
- Industry Photo Laboratories and X-ray Laboratories
- Industry Graphic Industry-Printing Houses
- Industry Mechanical Workshops
- Industry Chemical Laboratories
- Industry Gas Stations
- Industry Mining
- Industry Mineral
- Industry Pulp and Paper
- Industry Food Processing
- Industry Textile Industry
- Industry Tannery
- Service Industry: Tourism
- Service Industry: Restaurants

Annex 4: Summary Report from the Project Meeting in Mudanjiang 20 April 1999

Mudanjiang 21 April 1999

Participation

Mr Ye Zhen Yuan, MEPB
Mr Sun Zimeng, MEPB
Mr Zhu Baozhong, MEPB
Mr Niu Baochun, MEPB
Mr Li Bo, MEPB
Mr Chen Yong, Interpreter
Mr Stig A. Borgvang (NIVA)

1. Introduction

1.1 During discussions between the Heilongjiang Environmental Protection Bureau (HEPB), the Heilongjiang Environmental Monitoring Central Station (HEMCS) and their Norwegian partner in the Sino-Norwegian project in the Songhua River system, the Norwegian Water Research Centre (NIVA), it has been suggested to single out one sub-catchment as a case catchment in the Songhua River catchment. After further consideration, the Mudanjiang catchment appears to be appropriate for the purpose of the co-operation project. The criteria used in the selection process were, *inter alia*:

- A certain number of industrial activities (small and large plants)
- Agricultural activities
- Existing chemical and hydrological monitoring stations
- A number of user interests linked to the river
- Varying land-cover
- Appropriate catchment size

1.2 Furthermore, the Mudanjiang catchment includes an important lake and has local expertise about the catchment, to facilitate the work of NIVA.

1.3 Against this background, it was decided that NIVA should visit the Mudanjiang Environmental Protection Bureau (MEPB) for a first preliminary study of the river catchment.

1.4 The visit of Mr Stig A. Borgvang to Mudanjiang was combined with the work of Mr Arne Veidel and Mr Morten Willberg (NIVA), who were there to finalise the installation of the automatic monitoring equipment in Mudanjiang.

2.1 Practicalities

2.1 Mr Ye Zhenyuan, Director of MEPB, welcomed NIVA to Mudanjiang. A number of his staff provided Mr Borgvang with the opportunity to get a first impression of the Mudanjiang river by showing the water work, the Hai Tang Hydrological Monitoring station (including a visit of the river bank), and by explaining some background information about the river itself. It was mentioned that a first treatment plant for the Mudanjiang City was under development and was planned to be operational within 2-3 years. This plant would have a capacity of about 100 000 tonnes/sewage per day (the whole city produces in the order of

250 000 tonnes of sewage per day, from industry and population).

2.2 It was explained that the purpose of NIVA's one-day visit was to assess whether there was scope for developing a case study in the Mudanjiang catchment.

3. Meeting

3.1 Mr Borgvang explained that the Mudanjiang catchment appeared to be appropriate according to the selection criteria (see section 1.1). NIVA was interested to learn, in general terms during the current visit, more about the availability of:

- Catchment maps
- Inventory of industrial plants
- Agricultural activities
- Main environmental problems linked to the river
- Planned and/or already implemented measures
- User interests

3.2 Mr Ye Zhenyuan, Vice-bureau economist explained that they perceived the untreated sewer load and the river bank erosion to represent the most important environmental problems for the Mudanjiang river system. Furthermore the organic load from industrial activities such as from the pulp and paper industry, chemical industry, pharmaceutical industry, food processing and refineries added to the problems of the river.

3.3 Mr Ye Zhen Yuan also explained that the water quality in the Mudanjiang River, categorised according to the Chinese water Classification System, varied from class 2 to class 5. It was explained that the DO concentration varied from about 3-9 mg/l over the year.

3.4 It was also explained that, in 1997, a dam had been built downstream the city of Mudanjiang, and that the hydrological regime of the river therefore had been altered. It would therefore be preferable to base the abatement strategy development on 1997-1998 data, rather than 1995 data (as originally planned)

4. Agreements

4.1 After further discussion, it was agreed that:

- NIVA should send, as soon as possible, a fax to HEPB (copy to MEPB) with a proposed outline of follow-up actions
- HEPB should study the draft outline and send any comments to NIVA
- HEPB should endeavour to:
 - Fill in the forms related to industrial activities (about 100 plants) and waste water treatment areas (see Annex 3)
 - Briefly describe measures implemented or planned concerning the reduction of pollution inputs into the Mudanjiang river
 - Describe and indicate on a catchment map the user interests related to the Mudanjiang river, existing and planned
 - Provide, if possible, monitoring data on water chemistry and hydrology for the years 1997-1998
 - Information about the oxygen content in the river water in 1997 and 1998, if available
 - Atmospheric deposition of pollutants, both to soil and water surfaces, if available

4.2. In order to facilitate the work of NIVA, MEPB handed over a map of the Mudanjiang catchment (scale 1: 500 000). This map does not include topography, and NIVA enquired about the possibility of obtaining such a map. MEPD explained that such maps are not available.

4.3 It was furthermore agreed that Mr Borgvang should examine the possibility of organising the next visit to Mudanjiang, possibly together with a second person from NIVA, for the period 27 June-10 July 1999. Such a possible visit would concentrate the work on discussions with local experts and field excursions in order to develop an abatement strategy to reach the goals for water quality in the river Mudanjiang.

Annex 5: Day-to-day summary of the training part of the mission

Monday 19 April 1999

Activities:

- An hour introduction at HEPR, related to the training to take place during the week
- The installed ENSIS version at the Monitoring Centre was updated. A new version of the application was installed, both on the server and on the only client. New dumps, consisting of monitoring data from the whole project area, were loaded into the server.
- The data to be provided for the ENSIS application was discussed and agreed on (see data requirements). It was decided to wait and see before deciding on who was going to do the actual import of the data (NIVA or HEPB/HEMC), the decision will be based on the experience from the training.
- The original programme for the training was reviewed
- ADACS could be installed successfully, but the telecommunication connection to the instruments could not be established. Mr Grotterød contacted NORGIT in Norway to get a solution to the problem. The NORGIT centre in Norway tested the system with the same type of loggers as in the Songhua River catchment and the application worked properly. It was concluded that the problems in Heilongjiang must be due to disturbance on the lines. NORGIT will work with HEPB/HEMC in order to solve the problem. The ADACS application must be made less sensitive to disturbance on the lines.

Tuesday 20 April 1999

Six people from Harbin took part in the training, some with no previous experience with ENSIS.

The following items were covered during Tuesday:

- The ENSIS team gave a general description of the system
- General GIS functionality such as zoom in, zoom out, pan, turning themes on and off, prioritising different layers were shown
- The following procedures were shown:
 - Manipulation of layer attributes, colour, scale, etc.
 - How to use GIS together with the water object forms
 - How to use GIS for data search purposes
 - Labelling of administrative units on and off.
 - Use of tool tip to scan objects
- Names of the administrative units were entered into the "master project", i.e. the version of the ENSIS project that is valid and the most updated.
- The structure and the functionality of the measurement database were explained. This encompasses:
 - Definition of the station as the location where the measurements are carried out.
 - Defining data-series
 - Entering the monitoring data
 - Processing of the monitoring data, i.e. features as graphical display, using statistics, quality assurance and flagging of data

Wednesday 21 April 1999

Activities:

The Project Meeting programme was adjusted. Furthermore, the Norwegian ENSIS team decided that the training on UDB, ADACS, advanced use of pollution sources and further use of ENSIS, needed to be covered in an extra training session in August/September 1999. The issues to be postponed, the justification and the proposed way forward are listed in the table below.

Issue for postponement	Justification and proposed way forward
ADACS	<p>The ENSIS operators must know the monitoring database (the measurement menu) in detail prior to importing and using the data from the instruments.</p> <p>Due to bad telecommunication, it was not possible to establish contact with the instruments. Instead of focusing on the training theoretically it was decided to postpone the training until a solution to the telecommunication problems was found.</p>
UDB	<p>The user database manager application is mainly of use for the system manager and needs a separate training session. In the user database, new projects are connected, maps are configured and the administrator provides the various users in the network with different privileges to access the data. This section takes at least one day of training and it was decided to cover the whole training for this application at a later stage. NIVA will instead configure the system with the necessary users and rights. This will be the solution until the next training session.</p>
Advanced Use of Pollution Sources	<p>Originally, the intention of the training was to cover the pollution sources more in depth and to import the required data into the database. Since the required data will not be available before 1 June 1999 and since it is not possible to start with the advanced part of the pollution source menu for the new Chinese operators, the day originally allocated for pollution source issues, was used to review the training in Oslo and to finish the necessary training on the measurement menu. The day was also spend on importing data from the data-loggers with help of the AC logger programme.</p> <p>Since the pollution source issues can not be covered in depth during this Project Meeting, NIVA undertook to enter the pollution source data, to be provided by HEPB/HEMC by the 1 June 1999. Pollution source issues will therefore be covered more in depth during the forthcoming training session.</p>
Other uses of ENSIS, including the use of the report generator	<p>This section must be covered during the forthcoming training session due to time constraints. It may cover:</p> <ul style="list-style-type: none"> - Advanced statistics and calculations - Report generator - Data-sets - Water Quality Classification

Furthermore, the following activities took place:

- Review of Basic concepts
- A brief introduction to all types of environmental information that can be covered by ENSIS
- Explanation of data-sets and how to use them (the details will be covered during the training in August/September 1999)
- The structure and the functionality of the measurement database were repeated, with more focus on the job training. This encompasses:
 - Definition of the station, i.e. the location where the measurements are carried out.
 - Defining data-series
 - Entering the monitoring data
 - Processing of the monitoring data, i.e. features as graphical display, using statistics, quality assurance and flagging of data

Based on the experience, the ENSIS team concluded that the prioritising of in-depth knowledge on fewer items gave a better result than trying to cover several themes superficially. It is important that the Chinese ENSIS operators know how to operate the system in detail. They must therefore practice on the topics dealt with during in this training session on a continuous basis up to the forthcoming training session in August/September 1999.

Thursday 22 April 1999

Activities:

- NIVA trained the Chinese ENSIS operators in the AAC data logger programme. The training also included conversion of AAC data to text files, to enable imports into the ENSIS database
- The Chinese ENSIS operators exercised relatively advanced use of the monitoring database.
- HEPB provided NIVA with digitised maps (on tape) in scale 1: 100 0000 (readable in UNIX machines only). They encompass thirteen different layers, such as distribution of water bodies, railway net. However, the legends are currently in Chinese only, but HEPB undertook to provide a translation into English by 1 June 1999.

Friday 23 April 1999

Activities:

- Review of the draft Summary Report
- NIVA recapitulated the procedures for importing both monitoring 'automatic' data from the AC logger and data from manual sampling (grab samples).
- NIVA reviewed and explained the documentation of the import procedures, which was distributed
- A copy of the ENSIS database in Harbin was installed on NIVA hardware
- NIVA explained how the FoxPro data needed to be organised in order to enable the import into ENSIS (Annex 7)
- NIVA submitted data sheets to be used for the preparation of the FoxPro data (see Annex 6)

Annex 6: Format for FoxPro data to be prepared for import into ENSIS

1: Provide exact station co-ordinates. The main flow direction at the stations should be defined according to:

1=NS

2=SN

3=WE

4=EW

File: "measurementposition_conversion.xls"

2: Define all data series in the FoxPro database by using the templates. There are three measuring positions ("Foxprodataseries.xls"), so there will be three series per parameter and station.

3: For each station and time series, the values for measurement position and parameter should be entered into the Excel sheet ("grab_timevalues_forxpro.xls").

Annex 7: Description of procedure for importing monitoring data into the ENSIS database

Stepwise procedure to import automatic and manual monitoring data into ENSIS

Information about monitoring data of sampling type 6, Grab sample (Grab sample, discontinuous measurement, instant value irregular time step) is also provided. Detailed information about this is given in *Italics* in the text.

The automatic monitoring data should be stored as text format in the AC-logger programme. It is assumed that all the data is of sampling type 1, Continuous measurements, regular time step and full duration.

1. Import the AC-logger file into Excel by File and Open in Excel. Highlight all columns in the import wizard and change them from General to Text. Ensure that both Date and Time are pasted into the same column.
2. Change the date and time format. The most convenient format for ENSIS is: DDMMYYYY HH:MM:SS, example: 29111997 23:32:17 (only ONE space between date and time).
3. Check that the station, measurement position, the parameter name and sampling method are correct and correspond with the formats in ENSIS. Replace wrong information (Edit and Replace). Station name, measurement position, parameter name and sampling method have to be entered in the same column, only separated by one space.

To make unique references to the data series with different measurement positions, it might be necessary to refer to both x, y and z-positions. If there are several samples across one river, different x and y measurement positions are probably entered in the database for the station. If so, reference should be made to one, two or three co-ordinates in order to make the reference to the data series unique.

4. Missing values are shown as -9900 in the present version of ENSIS, to avoid that missing values are included in statistical calculations and plotted graphically. 'Missing values' should be replaced with '-9900'.
5. The data is of sampling type 1, Continuous measurement, regular time step and full duration. ENSIS requires that a start time and an end time be given. A new column should therefore be inserted into your data sheet, the date/time column copied one row up and a new date/time added in the lower cell.

The monitoring data that is already imported into ENSIS is of type 6, Grab sample, discontinuous measurement, instant value irregular time step. Instant values have identical start and end time. So, when importing data of this type, only the existing column of date/time can be copied without further adjustments.

6. Copy the date/time columns as many times as there are measured parameters (e.g. 7 times if 8 parameters). Paste the date/time under each other.
7. Copy the station name/measurement position/parameter/Sampling method column wise, beside the date/time column.
8. Move the column of the measurement values.
9. Save the file as a text file, tab separated.
10. Start up ENSIS with the project you want to import the monitoring data to. Start the import routine (File | Import | Import/text/)
11. Find the text file just created (Browse button).
12. Select the data class N Time values (Import Class combo box).
13. Ensure that the correct number of rows is viewed. Click the Next button.
14. Define the location in the database where the data should be stored. Properties should be set for each of the columns. The list of properties is invoked by clicking with the right mouse button on top of the column. The data series (thereby also the measurement position) have to be in the database to enable references to be made. If there are none, they should be created before the import can start.
15. Highlight the first column, click the right mouse button and select Set Column Properties. Select the Property name dtmFromTime with correct date and time format (DDMMYYYY HH:MM:SS).
16. Highlight the second column in the similar way and set dtmToTime with correct date and time format (DDMMYYYY HH:MM:SS).
17. Highlight the third column, select Set column Property and select refTimeSeries. Select reStation!Text, refMeasPosition!lngZ, refParameter!Text and smplMthb!Key. Please note that the order should be the same as in the column of your import file. If you have more than 1000 samples, the process of verifying if the data series exist in the database may take several minutes.

If you need to refer to any other of the co-ordinates to get the unique measurement position, then refer to these in a similar way (refMeasPosition!lngX, refMeasPosition!lngY).
18. Highlight the fourth column and define this as Value.
19. Click Finish, and ENSIS checks the data first and then import them. The process can take several minutes or hours if there are thousands of samples.
20. Control that the data are imported properly via the dialogues (Measurements | Data series | Data series) in ENSIS.

Files⁵ that exemplify the import from AAC logger to ENSIS import files

Import original	(the original output file from the AAC logger)
Import_step1	(example file stored during the manipulation process)
Import_step2	(example file stored during the manipulation process)
Import_step1	(example file stored during the manipulation process)
Import_final	(file ready for import to ENSIS)

Grab_station

Grab_timeseries

Grab_time values

The last three files are used for import of grab samples

⁵ These files have already been submitted to HEPB

Annex 8: **Workshop in Harbin**

19-23 April 1999

Monday April 19th

Plenum

After a welcoming session chaired by Mr. Li Weixiang, the agenda of the Workshop was approved. It was agreed to have three separate group sessions.

1. Technical/ENSIS: Mr Tor Haakon Bakken, Mr Arne Veidel, Mr Morten Willbergh, Mr Audun Grotterød, (HECMS)
2. Water/ENSIS: Ms Kjersti Dagestad, Mr Stig Borgvang (HECMS)
3. Project Management: Mr Guo Yuan, Mr Dong Xianfeng, Mr Torstein Skancke, Ms Bente Wathne (HEPB)

Group discussions

The three groups have different minutes as follows:

Project Management

Annual Report discussions

Main Events of the Heilongjiang Project in 1998

The Annual report was used as basis for the discussion, and the following topics were looked at in detail:

1. **Data transfer.** Due to the economic burden of running an internet transfer between the server and clients at HECMS and clients and HEPB there are no plans for on-line transfer of data between the two institutions. Modems will be used and historical data shown at HEPB at the present stage. Two extra days of work are needed for NORGIT for the installation of the replication of the database at HEPB. The replication will be accomplished after the learning process is finished, and the Chinese experts are operating the ENSIS system.
2. **Maps.** Maps for Mudanjiang and for the Heilongjiang Province in digitised form are currently available in scale 1: 1000 000. It was agreed that there is need for a more detailed map and detailed information of the river system in Mudanjiang for implementing the river model. HEPB promised to do their best for providing the necessary information. During a visit to Mudanjiang, Mr. Stig Borgvang was shown more detailed maps: of the area. These maps are needed for the project work. The Chinese side mentioned that there are two problems with providing a more detailed map i.e. the cost may be high and the security may become a problem.

3. **Chinese version of ENSIS.** A Chinese language version of ENSIS shall be one of the results of the project work. In case there is a change from English to Chinese ENSIS version at this stage of the project, support will be difficult, because the Norwegian side cannot understand the Chinese text. It was agreed to change to Chinese language version as late as possible in the project, and as one of the last things we do before closing the project. However, the translation work of the necessary text will start as soon as possible to prepare for the change from English to Chinese language version. The group in Harbin will receive a list of the necessary words for translation, and will start the translation immediately when the details of the work and the expences have been agreed.
4. **Data collection.** The status of data collection will be evaluated in more detail in the ENSIS-WATERQUIS/water quality and abatement strategy group discussions.
5. **ADACS.** NORGIT explained that they have been working intensively on the ADACS throughout 1998. This was not mentioned properly in the Norwegian report prepared as an input to the 1998 Annual Report.
6. **Hardware.** In stead of buying a 36" screen, a projector which is more efficient for showing is bought. No prescribed WAN for transfer of data between the two server/client and client at HECMS and HEPB will be built at this stage, though two CISCO boxes have been bought. Modems will now be used, showing historical data at HEPB. This is another technical solution for the set-up than planned originally. HEPB will not use the WAN or Internet solution, but a more simple solution. One server and 8 workstations are now installed. Nowegian side agreed on such changies, though, originally, one server and 2 workstations were planned. After this change, it is suggested by the Norwegian experts, that the 2 cisco boxes may be returned to the supplier, which will need time to be discussed with experts from both sides

Revised Summary Work Plan

7. **Phase 3.** In addition to the programme described, it will probably be necessary to organise a visit for training and project discussions when Phase 3 is initiated in June 1999. Continuity of personnel for training in ENSIS is important. The personnel sent to Norway for training is the basic personnel for further training in China, and the tutorial plans prepared for each training session will be constructed on the basis of knowledge already transferred. Also for capacity building the basic personnel will be most important for the necessary progress.
8. **Project extensions.** As a part of the Work plan for Phase 2 and 1999 there will be an evaluation of the monitoring system and possible needs for extensions. During Phase 3 plans will be made for extensions of the water monitoring and surveillance programme and an integrated strategy for optimal water pollution abatement in the Songhuajiang River system. An agreement was also made to incorporate an Air Quality Surveillance and Information system for Harbin and possibly Heilongjiang Province in the future co-operation project that will be discussed recently. Two new topics were also mentioned for incorporation in the new plans, emergency handling procedures and analysis of organic micro pollutants. A dissemination part will be important in an extended co-operation, with HEPB as centre for ENSIS in Northern China. It is unclear whether a new project/project extension should best be handled through the SEPA system or through MOST. Both parties agreed to ask advice before they suggest the best choice. Hopefully a complete new project proposal including all above mentioned parts will be made, and submitted to both Chinese (MOST or SEPA) and Norwegian (NORAD) authorities concerned. It is also agreed that both sides will try to find the possibility to start the new

project as soon as possible, or possibly implement it in parallel with the existing work, in order to save both time and budget. The possibilities for an extended or new project depends on a successful progress of the running project, according to plans.

Project costs in 1998

9. HEPB informed that they have had questions from MOST concerning how the accounts for 1998 were calculated and presented. This means that there may be some changes compared to the account presented in the 1998 Annual Report.

Work Plan and Budget for 1999

10. **Visit to Harbin in June/August.** In addition to the work plan and time schedule given in the Annual report, it may be necessary to include extra a short visit for training and project following up in June 1999. The exact time of the visit will depend on the progress in the training process with ENSIS.
11. **Budget for 1999.** The need for an agreed budget within the budget frames given by NORAD was acknowledged. The Chinese side agreed to prepare their budget that will be allocated from NORAD to MOST for 1999 within the frame of NOK 490.000. It has been made clear that the total budget for the project is fixed as both SSTC and NORAD has signed, and the budgets allocated for both sides have also been fixed.
12. **Intercalibration.** NIVA explained in more detail about the suggested plans for the intercalibration work in 1999. It is suggested for the Chinese institutions in Harbin and Yantai to join an international intercalibration exercise run by NIVA. This is under the auspices of UN and the Agreement for Long Range Transported Air Pollution, and most European countries join this intercalibration together with labs from the US. The laboratories in Harbin and Yantai will be the first Asian laboratories to join this intercalibration. A specially designed part will be added for the Chinese projects to this intercalibration exercise. This will reduce the necessary budget to the minimum of NOK 20.000 as suggested for Norwegian side for 1999.

Tuesday April 20th

There were agreed on 3 separate group sessions.

Mudanjiang:	Mr Arne Veidel, Mr Morten Willbergh, Mr Stig Borgvang
Water/ENSIS:	Mr Audun Grotterød, Mr Tor Haakon Bakken, Ms Kjersti Dagestad (HECMS)
Project Management:	Mr Guo Yuan, Mr Dong Xianfeng, Mr Torstein Skancke, Ms Bente Wathne (HEPB), Mrs. Chen Aifeng, Ms Wu Yuehui

Group discussions

The three groups have different minutes:

Project Management

Project Extensions

The second part of the meeting, Tuesday April 20th, was used for more detailed discussions of possible project extensions and further project co-operation.

Extensions of the running project on water surveillance and monitoring

1. This project, covering surveillance of such a large river system, is the only project in the whole country of its kind, and therefore will be a model for the whole country, if we are successful.
2. As extensions, analysis of organic micro pollutants and emergency handling procedures are listed, in addition to abatement strategy and further development of the modelling work. The model shall be appeared first for Mudanjiang, then for the whole province. Dissemination of achieved results is important.
3. Organic pollutants represent a problem for almost all rivers in China, and the analytical work to be suggested in the proposal may be a model for other rivers and areas on how to control organic pollutants. Jilin province, with its chemical industry, is an important source of organic micro pollutants for the Songhuajiang River system. Improving the analytical capacity of the HEMC will be important. Transfer of knowledge for analyses by sending students to Norway and analytical trained persons to Harbin may be possible. NIVA will contact the State Pollution Control Authorities (SFT) in order to try to get institutional building in this field, and also on accidents and oil spill prevention and handling as part of the project. Both sides has also discussed the possibility to send persons to work in Norway (NIVA, NILU, or NORGIT). The person can be as a coordinator who can help to the cooperation work of both sides, which can also be a part of the present project.

Air quality surveillance and monitoring

4. Air quality surveillance and monitoring project is as far as we know not carried out for a whole province or region in China. This may be the first project of this kind, and may be used as a model for others.
5. The NILU/NORGIT proposal from 1997 puts more weight into the modelling work than the Chinese one from 1998. A surveillance programme may be performed much more efficiently by use of a dispersion model, saving money on the equipment side. The original Chinese plan contains 27 stations and 7 mobile stations, but by efficient use of models this may be reduced significantly. Equipment is provided from Japan (second hand, wet chemical methods), but this is not the most up-to-date equipment and the number is even not enough for the present monitoring work. The new concept from the Chinese side, to cover the whole province for air quality monitoring and surveillance, was agreed. This concept should be followed up by NILU. The new concept of this proposal is to extend the project to cover 4 cities and including one mobile station.
6. SEPA-regulations for air monitoring advise that for an area, there should be at least a certain number of monitoring stations for each 1 mill. inhabitants, and in addition, for each city, there shall be one back-ground station. Harbin has 6 mill. inhabitants, resulting

in 6 stations for monitoring air quality and one back-ground station. Before 1996 monitoring of air quality was performed only 5 days every 3 months, with manual methods. And now it is required by SEPA to make a report once a week. This manual approach can be supporting a dispersion model approach, as stated in the paragraph 4.

General comments to further co-operation

7. The North of China is considered as the underdeveloped part of China. The economic situation is difficult, compared to other parts of China. The possibility for HEPB to be an agent for SEPA should be further developed by the Chinese partners. At national level, the project has been given high interest by SEPA and the national monitoring centre.
8. The NORAD policy for supporting equipment to China will be through loans. Then loans are needed to make a full monitoring system. Only necessary equipment for establishing a system is normally given as a grant. An extensive monitoring system, with many stations, will have to be financed otherwise. NORAD gives priority to transfer of knowledge, and supports only equipment to a necessary extent to allow transfer of knowledge in an optimal way.
9. Mapping can be a granted part of the extensions project. NORGIT can possibly provide better maps through satellite pictures (Spot satellite).
10. Emergency. Accidents and leakage of pesticides and toxic chemicals, may be connected to ENSIS in some way, because the models for dispersion in air and water may be used. NIVA will contact with SFT, and discuss possibilities for co-operation in this field.
11. The further co-operation may be divided into three parts, a. Air Part, (new project) b. Capacity building/institutional building and c. Extension of the water part. If the priority has to be given to these tasks, how will the Chinese side prioritise them? Priority from the Chinese side. For water part, a. Mudanjiang area extension of monitoring capacity. b. Organic pollutant monitoring c. Other extensions of ENSIS WaterQuis. And the the Air project as a new part should be given priority.
12. Conclusions from the project discussions were that the Chinese side favours an Air project for four cities including one mobile station and try to extend with more equipment later. At this first stage the automatic stations may be combined with manual stations to satisfy the need for surveillance. Teaching in the four cities for surveillance of air quality will be a part of the project. Dissemination of the activities already finished through the existing project will also be possible through this part of the extended project.
13. It was agreed that a visit/stay of a Chinese expert to Norway for some months would be of benefit to the co-operation. The Norwegian side promised to investigate the possibilities for a Chinese expert of receiving a grant for such a stay. It has been mentioned that the interest of the project may be available for supporting the stay.

Harbin April 21nd



Mr. Guo Yuan



Ms. Bente M. Wathne