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Surveillance of Water Quality in the Songhuajiang River System in Heilongjiang Province - Pre-feasibility study - 1995

Travel report from Heilongjiang Province, China, October/November 1995

NIVA - REPORT

Norwegian Institute for Water Research NIVA

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Main Office	Regional Office, Sørlandet	Regional Office, Østlandet	Regional Office, Vestlandet	Akvaplan-NIVA A/S
P.O. Box 173, Kjelsås	Televeien 1	Rute 866	Thormøhlensgt 55	Søndre Tollbugate 3
N-0411 Oslo	N-4890 Grimstad	N-2312 Ottestad	N-5008 Bergen	N-9000 Tromsø
Norway	Norway	Norway	Norway	Norway
Phone (47) 22 18 51 00	Phone (47) 37 04 30 33	Phone (47) 62 57 64 00	Phone (47) 55 32 56 40	Phone (47) 77 68 52 80
Telefax (47) 22 18 52 00	Telefax (47) 37 04 45 13	Telefax (47) 62 57 66 53	Telefax (47) 55 32 88 33	Telefax (47) 77 68 05 09

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Abstract:

A request for co-operation on a system for water quality surveillance of Songhuajiang River System in Heilongjiang Province, China, was received by NIVA from the Environmental Protection Agency (EPA) of the Heilongjiang Province. Funds were made available from NORAD, to initiate a co-operative work with the EPA. T. Skancke, NORGIT Centre, and B. M. Wathne, NIVA, travelled to Harbin, capital of Heilongjiang Province, to make a pre-feasibility study and project plans for further co-operation. The Songhuajiang River System provides drinking water for a population of nearly 30 mill., industrial and agricultural water, as well as aquatic products and shipping conditions. Despite great efforts from the local authorities during the last 10 years, the water quality in Songhuajiang River has improved little, and the water is still heavily polluted. During the visit, the project and the work plan were discussed in more detail and the partners agreed to establish a permanent co-operation within the field of environmental surveillance and information. An Agreement for Technical co-operation between NIVA and EPA was signed. A proposal describing the co-operative project will be finalised at NIVA, based upon the concept discussed and agreed.

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Project manager

Bente M. Wathne

Bente M. Wathne

For the Administration

Gunnar Fr. Aasgaard

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Surveillance of Water Quality in the Songhuajiang River System in Heilongjiang Province - Pre-feasibility study - 1995

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Summary and conclusions

A request for co-operation on a system for water quality surveillance of Songhuajiang River System in Heilongjiang Province, China, was received in 1994 by the Norwegian Institute for Water Research (NIVA) from the Environmental Protection Agency (EPA) of the Heilongjiang Province. In 1995 funds were made available from the Norwegian Department of Foreign Aid and Development (NORAD), to initiate a co-operative work with the EPA of Heilongjiang Province. The co-operative work should aim at establishing a modern environmental surveillance and information system in the Heilongjiang Province.

Torstein Skancke, NORGIT Centre, and Bente M. Wathne, NIVA, travelled to Harbin, capital of the Heilongjiang Province, to make a pre-feasibility study and project plans for further co-operation on an environmental surveillance and information system for Songhuajiang River in the Heilongjiang Province. Meetings, presentations and discussions were held at EPA/EPB of the Heilongjiang Province, the Environmental Monitoring Central Station of the Heilongjiang Province, and Harbin Environmental Protection Bureau. The institutions working on environmental protection in Heilongjiang Province and in the city of Harbin were presented, and information was given about the pollution problems of the Songhuajiang River and the Heilongjiang Province. Presentations were also given of the visiting institutions NIVA and NORGIT, and the surveillance system ENSIS.

The Songhuajiang River System provides drinking water for a population of nearly 30 mill., industrial and agricultural water, as well as aquatic products and shipping conditions. People's life and economics in Songhuajiang Valley depend on the river. Despite great efforts from the local authorities in the Heilongjiang and Jilin Provincial Governments during the last 10 years, the water quality in Songhuajiang River has improved little, and the water is still heavily polluted. Songhuajiang River is also a boundary river between China and Russia, and its pollution affects the relationship between China and Russia.

In order to control the pollution permanently, there is a great need to establish a system to monitor Songhuajiang River pollution and pollutant discharge from main sources, to control the water quality monitoring information, and to provide a scientific basis for renovating work and good abatement strategy.

During the visit, the project and the work plan were discussed in more detail and the partners agreed to establish a permanent co-operation within the field of environmental surveillance and information. An Agreement for Technical co-operation between Norwegian Institute for Water Research and Environmetal Protection Agency of the Heilongjiang was signed. A proposal describing the co-operative project will be finalised at NIVA, based upon the concept discussed and agreed.

1. Introduction

A request for co-operation on a system for water quality surveillance of Songhuajiang River System in Heilongjiang Province, China, was received in 1994 by the Norwegian Institute for Water Research (NIVA) from the Environmental Protection Agency (EPA) of the Heilongjiang Province. In 1995 funds were made available from the Norwegian Department of Foreign Aid and Development (NORAD), to initiate a co-operative work with the EPA of Heilongjiang Province. The co-operative work should aim at establishing a modern environmental surveillance and information system in the Heilongjiang Province.

NIVA is working closely together with the Norwegian Institute for Air Research (NILU) and the NORGIT Centre on an environmental surveillance system covering a broad area of application. The system covers surveillance of both air and water, and was demonstrated and tested during the Olympic Games at Lillehammer in February 1994. The same institutions are interested in co-operation for introduction of an environmental surveillance system for the Heilongjiang Province, and also to plan for a total surveillance system of the region, suitable for surveillance of both water and air quality.

Since pollution of the Songhuajiang River was the major environmental problem identified in the first request from EPA of the Heilongjiang Province, a visit from Bente M. Wathne, NIVA, and Torstein Skancke, the NORGIT Centre, was paid to EPA in Harbin, Heilongjiang Province from October 30. to November 3. 1995. During the visit, solutions for a water surveillance system were discussed, together with plans for the same system to cover also surveillance of air pollution.

The main objective for the first part of the system will be to enable high quality surveillance of the Songhuajiang water course in the most effective way. This means to provide the information needed about the Songhuajiang water quality, and to provide on-line data and information transfer and a more or less direct and remote quality control of the data collection. This will require that continuos measurements with new sensor technology are made available at the necessary number of monitoring stations, to be combined with the results from the samples analysed in the laboratory after manual sampling.

More details from the visits and meetings in Harbin, Heilongjiang Province together with the agreement signed are shown in the Appendixes.

2. Visit to Harbin, Heilongjiang Province

Torstein Skancke and Bente M. Wathne arrived in Beijing Monday morning October 30., and were met at the airport by a representative from Kinareiser who provided the air fare tickets to Harbin. Departure was later on as planned to Harbin, capital of the Heilongjiang Province. We were met at the airport in Harbin by Bao Li, Section Chief for Foreign Co-operation Division of EPA and one employee from his department acting as interpreter.

2.1 Meeting in EPA/EPB of the Heilongjiang Province

Tuesday morning we were picked up by the institute car for a meeting at EPA/EPB of the Heilongjiang Province. Present were:

- Wang Jing Chun, Vice director of Heilongjiang Province Environmental Protection Bureau
- Bao Li, Section Chief for Foreign Co-operation Division

- Guo Yuan, Division Chief and Senior Engineer in Foreign Co-operation Division
- Chen Qingli, Head of Supervising and Monitoring Department
- Mrs. Ling, Senior Engineer for Central Monitoring station

An interpreter from the Foreign Co-operation Division was helping out during the whole visit. Copies of cards presenting the people we met in Harbin are shown in Appendix B.

Presentations were given of NIVA, NORGIT and the surveillance system ENSIS.

A presentation of the EPA/EPB of the Heilongjiang Province was given by its representatives. EPB of Heilongjiang Province has 96 employees and is the second level in the national system of Environmetal Protection Agencies. First level is NEPA, the overall national Protection Agency situated in Beijing. The next level is the province level throughout the country, and the third level is on the city or district level.

2.2 Meeting in the Environmental Monitoring Central Station of the Heilongjiang Province

After lunch, a visit was arranged to the Environmental Monitoring Central Station (EMCS) of Heilongjiang Province. New presentations were given of NIVA, NORGIT and the surveillance system ENSIS and of the same material as shown before lunch. In addition we received information about the Songhuajiang River, the monitoring programme and the Environmental Monitoring Central Station. Present were

- Chen Aifeng, Head of Environmental Monitoring Central Station

together with four of her co-workers in addition to the group we met before lunch (see people listed under 2.1.) More information on the Songhuajiang River system is presented in Appendix C.

2.2.1 Presentation of the Environmental Monitoring Central Station

The Environmental Monitoring Central Station (EMCS) of the Heilongjiang Province Environmental Protection Agency is the central station for all environmental activities in the province. The EMCS has been monitoring the whole provincial environment since its establishment in the seventies. Its personnel has good professional knowledge and experience. Among the 86 staff members, 16 are senior engineers, 32 are engineers, 10 are assistant engineers, 2 are technicians. The monitoring station is devided into 9 departments, 4 of them on the technical side as follows:

- Department for Integration
- 1st. Department. for Monitoring, covering water, soil, and aquatic animals
- 2nd Department for Monitoring, covering air and noise
- Department for Quality Control

Since it began to work on its own in 1985, it has been the centre of the provincial monitoring network, and the technical and data centre (now its data bank has stored about one million data on the provincial environment).

The reports and control work of environmental quality and environmental monitoring quality accomplished at the CMS are at an advanced level in the country. The EMCS has carried out many important scientific environmental investigations, four of which are rewarded by the Provincial Government.

We also made a visit to the labs and data room. The EMCS laboratory has equipment for analysis of the water samples taken, including ion chromatograph, atomic absorption chromatograph (AAS), gas chromatograph (GC), equipment for BOD, COD, liquid chromatograph (LC) and high pressure liquid chromatograph (HPLC).

All people doing analytical work in other parts of the province as f.ex. in industrial plants have to attend a course at EMCS for training and certification. They also have to be updated once a year if the results of their analytical work shall be used in reports to the authorities.

In the Heilongjiang Province there are 79 counties, 10 big cities and 15 districts. A total of 140 - 150 monitoring points are reporting results. EPA gives discharge permissions and may also stop production and fine them when the discharge is above the limits set. Under the leadership of the EMCS there are branch monitoring stations in cities and counties of the Heilongjiang Province.

2.2.2 Water Monitoring Programme

In Songhuajiang River there are 20 monitoring stations each covering several monitoring points. The total number of monitoring points are 140 - 150. Measurements and sampling are also made from a boat. Some analysis are performed at the boat, but the rest of the samples are brought to the lab for analysis. The samples are taken in traverses across the river in three points, along each bank and in the middle point of the river. Normally the samples are gathered 8 - 12 times a year, at least 2 x during flooding, and ca 1800 data is gathered each year. The standard measured components are as follows:

pH, turbidity, hardness, conductivity, DO, COD, BOD, NH_3, NO_2-N, NO_3-N, volatile phenol, CN, As, Hg, Cr, Pb, Cd. Totally they could measure up to 18 parameters.

Summary results from the water quality monitoring of the Songhuajiang River in 1990 are given in Appendix D.

The present water quality monitoring can only provide some routine index of water quality and comprehensive index of organic pollutants, but can not monitor the various organic pollutants and some poisonous substances. The eight times of monitoring per year can not monitor the instantaneous discharge of pollutants; the backward transmission of monitoring messages delays the timely treatment of the related governmental section; thus, the administrative work is made very passive, and the renovation measures are blind.

In order to control the pollution permanently, there is a great need to establish a system to monitor Songhuajiang River pollution and pollutant discharge from main sources, to control the water quality monitoring information, and to provide a scientific basis for renovating work and good abatement strategy.

2.3 Meeting in Harbin Environmental Protection Bureau

Wednesday November 1st. a visit and meeting was arranged at Harbin Environmental Protection Bureau. Harbin EPB is responsible for the environmental monitoring in the city of Harbin, capital of the Heilongjiang Province, and represents the third level in the national system of Environmetal Protection. Present were

- Bao Li, Section Chief for Foreign Co-operation Division, EPA of Heilongjiang Province
- Chen Qingli, Head of Supervising and Monitoring Department of Harbin Environmental Protection Bureau

- Mr. Zheng, Head of Harbin Monitoring station
- Mrs. Tan Yingqin, Senior Engineer for Harbin Monitoring station

Two interpreters were helping out during the meeting.

Presentations were made of the visiting Norwegian Institutions and information were given from the Chinese hosts about the water management and pollution problems of Harbin.

2.3.1 Domestic Water

Public water demand is 900.000 ton/day for domestic use. 60 - 70.000 ton/day is from groundwater, the rest is taken from Sonhuajiang River. Industry have their own water production and supply.

70% of the sewage from the Harbin area is discharged directly into the river. Of the total daily discharge 80% is from industry and 20% domestic sewage. In most of the 10 - 11 big cities along the river, sewage is discharged untreated. The national water quality standards are divided into 5 classes as in Norway (see Appendix C). There are also given both national and local standards, where the local standards may be more strict and overrule the national ones.

The domestic waste waters from 3 sewage counties of Harbin are discharged at 13 points into the Songhuajiang River.

From Harbin is registered a daily discharge of approx. 800.000 ton water. Discharge from 3 mill. persons in the city centre and approx. 5 mill persons when counting the suburbs. A detailed list describing the population density, and also the sewage and industrial wastewater discharge from the major cities into the Songhuajiang River, is given in Appendix F.

2.3.2 Industrial Water

The Heilongjiang Province has many-sided industrial activity of different branches. When regarding water pollution problems, the most important industrial plants are within:

Pulp and paper industry
Medical industry (ca. 20 plants.)
Oil Refinery
Brewing industry and mineral water production
Chemical industry
Petroleum products
Machinery (less important)
Textile industry

A physical-chemical sewage cleaning plant is planned for a medical factory producing penicillin, with 25.000 ton waste water/day. Questions were asked if it would be possible for Norwegian funds to support the instrumentation needed for discharge control of such a penicillin factory.

In Appendix F a list of population, sewage and discharge data for the Heilongjiang Province is shown.

2.3.3 Air quality

Atmospheric measuring stations exist with automatic monitoring at one central station and four substations. The automatic monitoring programme was stopped due to lack of money and trouble with the equipment. The central EPA of China has required that Harbin should have an automatic monitoring system including seven monitoring stations, but lack of funds has stopped further development of the air quality monitoring programme. There is a need for financial support and upgrading of the monitoring equipment to start the monitoring programme on air pollution again.

2.4 Visit to an Oil Refinery Plant

After lunch a visit was made to the local Oil Refinery close to the city of Harbin. A short presentation was given by the director and the responsible for environmental protection at the plant. We also saw the cleaning process for wastewater from the production and the labs were the water samples were analysed. Samples of flue gasses from the plant were analysed in the same lab building. Also air quality measurements from the plant area were made. The discharge water went through a cleaning process, reducing the oil content before it was discharged into the Songhuajiang River.

3. A Surveillance System for Water Quality in Songhuajiang River

Thursday November 2nd a meeting was held at the EMCS with presentation from Torstein Skancke of the OLUF programme on the screen. OLUF is a programme presenting air quality measurements for the city of Oslo. The Chinese partners expressed their interest in using such a system for the Heilongjiang Province and the big cities of the Province.

3.1 Project planning

The project and the work plan were discussed in more detail. The project work was preliminary divided into three phases.

Phase 1.
- a. Making a detailed plan for water monitoring and surveillance
- b. Start work on the discharge database

Phase 2.
- a. Start monitoring at ~ 8 stations/points
- b. Make plans for the air monitoring
- c. Make plans for extension of water monitoring and surveillance
- d. First data for a water course model for Songhuajiang river systematised. Placing discharge points.
- e. Install 2 servers and 8 PC's.
- f. Chinese delegation to Norway for education of four key operators and visit of 2-3 persons at the managerial level.

Phase 3.
- a. Making the model ready for use and into operative status.
- b. The discharge database is operative

c. Telecommunication operative

d. Education of Chinese colleagues in Harbin to run the system.

e. Planning an intergrated strategy for optimal water pollution abatement

The Chinese partners expressed their willingness to pay for all expenditures concerning local man power and infrastructure such as buildings, monitoring shelters, transfer lines etc..

The proposal describing the co-operative project will be finalised at NIVA, based upon the concept discussed and agreed. Information and efforts needed from EPA of the Heilongjiang Province to follow the agreement between the partners, is listed below:

1. Discharge data for:
   a. Industry, giving amount of daily discharge (ton/day), permit/allowance data from EPA, (amounts and main components) and measured values of the same.
   b. Domestic/municipal waste water, tons/day
   c. Area of agricultural production
   d. Population
   e. Runoff/flow values in more detail if possible
   f. Location of the key (most important) discharge points

2. Water quality data:
   a. Parameters normally measured manually
   b. Measuring range expected at the selected measuring points or some representative points in the river.

Most of the needed information was already given from the Chinese partners during the visit in Harbin, and is cited in Appendix B - F.

3.2 Agreement for Technical Co-operation

There were also discussions of the agreement for future co-operation and the surveillance project. A draft for such an agreement was brought form Norway and presented form the Chinese Partners. Wang Jing Chun, Vice director of Heilongjiang Province Environmental Protection Bureau wanted to sign the co-operation agreement right away, but the agreement needed input of the names of the responsible person and of the director to sign. The solution was to correct these details and send the agreement back for signing. The partners have now agreed to establish a permanent co-operation within the field of environmental surveillance and information, and the signed Agreement for Technical co-operation between Norwegian Institute for Water Research and Environmetal Protection Agency of the Heilongjiang is shown in Appendix G.

4. Inspection of the Songhuajiang River

Friday November 3rd we were picked up from the hotel by Guo Yuan from the Foreign Co-operation Division and our interpreter. We went down to have a walk along the riverside, to see as much of the river as possible and take pictures. Afterwards we had a short visit and sightseeing of Harbin city, before we left for the airport. We had a flight to Beijing where we met with Bjarne Sivertsen arriving from Tianjin.

Appendix A

Schedule for travel in China - ENSIS project group, October/November 1995.

Date	Time	Place	Participants
Sunday 29/10	Dep. 13.35 hrs	Oslo (SK465)	TS, BMW
	Arr. 14.40 hrs	Copenhagen	
	Dep. 15.45 hrs	Copenhagen (SK995)	
Monday 30/10	Arr. 07.45 hrs	Beijing	
	Dep. 15.35 hrs	Beijing(CA 1621)	
	Arr. 17.10	Harbin	
Tuesday 31/10-Thursday 2/11		Meetings in EPA, Harbin	TS, BMW
		Stay: Hotel Songhuajiang Gloria Inn, Harbin	
Friday 3/11	Dep. 16.50 hrs	Harbin (CJ6161)	TS, BMW
	Arr. 18.25 hrs	Beijing	
Friday 3/11-Sunday 5/11		Stay: SAS Hotel Beijing	BS, TS, BMW
Sunday 5/11	Dep. 15.05hrs	Beijing (Train or car)	BS, TS, BMW
	Arr. 17.06 hrs	Tianjin	
		Stay: Arranged locally	
Monday 6/11	Meetings in Tianjin		BS, TS, BMW
	Dep. 19.50 hrs	Tianjin	
	Arr. 21.34 hrs	Beijing,	BS, TS, BMW
		Stay: SAS Hotel Beijing	
Tuesday 7/11	Dep. 18.40 hrs	Beijing (SZ4588)	BS, TS, BMW
	Arr. 19.40 hrs	Yantai	
Wednesday 8/11-Friday 10/11		Meetings in Yantai	BS, TS, BMW
		Stay: Arranged locally	
Friday 10/11	Dep. 18.55 hrs	Yantai (MU5133)	BS, TS, BMW
	Arr. 19.55 hrs	Beijing	
Friday 10/11-Sunday 12/11		Stay: SAS Hotel Beijing	
Sunday 12/11	Dep. 10.20 hrs	Beijing (SK996)	TS, BMW
	Arr. 13.20 hrs	Copenhagen	
	Dep. 14.20	Copenhagen (SK464)	
	Arr. 15.25 hrs	Oslo	

TS = Torstein Skancke
BS = Bjarne Sivertsen
BMW = Bente M. Wathne

Appendix B

Cards presenting the people we met in Harbin, Heilongjiang Province, China,

October/November 1995

Deputy-Director of Harbin Environmental Protection Bureau
Director general of Environmental Science Society of Harbin City.

Li Gui You
Senior Engineer

№.499 Tongda Str.,Daoli Distr.,HarbinP.R.China150076
Tel:4601417 Home,4618167 Fax,86-451-4602624

副局長 **王景春**
Vice Director · *Wang Jing Chun*

黑龍江省環境保護局
HEILONGJIANG PROVINCE ENVIRONMENTAL PROTECTION BUREAU

中國哈爾濱市南崗區大直街 308 號 郵編 Postcode: 150001
Add: No.308 Dazhi St. Nangang Dist. Harbin, China
電話 Tel: 3633659(Office) 2520130(Home) 傳真 Fax: 3649273

黑龍江省環境保護局
對外合作處
FOREIGN COOPERATION DIVISION
HEILONGJIANG PROVINCE ENVIRONMENTAL PROTECTION AGENCY

國元
Guo Yuan
副處長 高級工程師
Division Chief &
Senior Engineer

哈爾濱市南崗區東大直街 308 號
No. 308 Dong Dazhi St. Nangang
Dist. Harbin P.R. China
電話 TEL: 3633652
傳真 FAX: 0451－3649273
郵編 P.C.: 150001

黑龍江省環境保護局
對外合作處
FOREIGN COOPERATION DIVISION
HEILONGJIANG PROVINCE ENVIRONMENTAL PROTECTION AGENCY

包力
Bao Li
副科長
Section Chief

哈爾濱市南崗區東大直街 308 號
No. 308 Dong Dazhi St. Nangang
Dist. Harbin P.R. China
電話 TEL: 3633652
傳真 FAX: 0451－3649273
郵編 P.C.: 150001

Appendix C

Information on Sonhuajiang River System including Quality Classes defined by the National Water Quality and National Water Quality Criteria for Surface Waters adopted by P.R. China

C.1. Description of the Songhuajiang River System

Songhuajiang River is the longest river in the North-eastern river valley. It has two sources: the south source is the second Songhuajiang River, originating from Changbaishan Tian Chi in Southeast of Jilin Province; the north source is its largest branch - Nenjiang, originating from Yilehuli Mountains in Da Hinggan Ling. The second Songhuajiang River flowing north-westwards from Changbaishan Tian Chi combines, at Sanchahe in Fuyuan county, with Nenjiang flowing from the north, and from this point it is called Songhuajiang River. Songhuajiang River then flows Northeast across south Heilongjiang, then through the narrow valley of south Xiao Hinggan Ling, to join the boundary river - Heilongjiang River at Tongjiang County in Sanjiang lowland.

Songhuajiang River has the length of 1927 km, and the valley area is 546 thousand km^2. It flows through the three provinces of Heilongjiang, Jilin and Inner Mongolia, in the valley where there are 1000 different rivers branching out. The valley area in Heilongjiang Province is 313 thousand km^2, accounting for 69% of the total area of Heilongjiang Province. The rivers of Lalin, Mudanjiang and Woken join Songhuajiang River main stream at its right bank, and among others the rivers of Hulan, Tangwang and Wutong, join at its left bank. The main industrial cities and agricultural and forest production base of Heilongjiang Province are all in the valley. The valley area contains 7550 thousand hectares of cultivated lands, and the population is 29.59 millions. The yearly runoff volume of Songhuajiang River is 73300 millions m^3. Influenced by rainfall and snow melting, the runoff volume changes during the year. The runoff volume in May and June accounts for 20%; from July to September for 60 - 70%; the winter runoff volume accounts for less than 5%. The difference between the dry and raining seasons is very obvious.

Songhuajiang River is ice covered for 5 months every year, and the thickness of ice is 1.25 - 1.40 metres. Songhuajiang River is one of the world longest rivers with the characteristics of the cold temperate zones. Various plants, animals and fish are living in the rivers, lakes, pools and reservoirs of different temperature.

Songhuajiang River has the highest economic importance in Heilongjiang Province. It is the provincial economic lifeline. It provides drinking water, industrial and agricultural water, as well as aquatic products and shipping conditions. The People's life and economy in Songhuajiang River valley is depending on the river.

C.2. Water Pollution Problems

Along with the increase in population and development of the Songhuajiang River valley economy, an increasing amount of industrial and agricultural waste water and domestic sewage flows into the river, resulting in a markedly reduced water quality. This increase in the contamination level has destroyed the aquatic ecological environment in the river system. According to monitoring data, DO, MnO_4^- index, BOD and volatile phenol in Songhuajiang River water every year exceed the Water Quality Criteria for Surface Waters (functional standards). This phenomenon is most serious in dry seasons (icebound season).

The national water quality criteria are divided into 5 classes as in Norway. In table C.1 the Water Quality Classes defined by the National Water Quality Criteria for P.R. China is shown. In addition to the national standards, there are also given local standards that may set stronger limits for the water quality and overrule the national standards within a province. In table C.2 the National Water Quality Criteria for Surface Waters adopted by P.R China is given.

Table C.1 Water Quality Classes defined by the National Water Quality Criteria for P.R. China

Class no.	**Description of class**
Class I	Water resources and nationally protected bodies of water
Class II	Potable water resource class 1 protection areas, high value fish protection areas, spawning habitats for fish, shrimp, etc.
Class III	Potable water resource class 2 protection areas, general fish protection areas, and swimming areas
Class IV	Water bodies for industrial and recreational use
Class V	Water bodies for agricultural and general scenic amenity

During the recent ten years, Heilongjiang and Jilin Provincial Governments have invested nearly 3000 millions RM. for renovation of Songhuajiang River, and reduced the discharge of some pollutants, but the water quality of Songhuajiang River has improved little. One of the reasons is the lack of necessary information on the river pollution, and the lack of key measurements.

Table C.2 National Water Quality Criteria for Surface Waters adopted by P.R China (mg/l).

Class Parameter	1	2	3	4	5
pH	6.5 - 8.5				6-9
Sulphate	250	250	250	250	250
Chloride	250	250	250	250	250
Dissolved iron	0.3	0.3	0.5	0.5	1.0
Manganese	0.1	0.1	0.1	0.5	1.0
Copper	0.01	1.0(0.01)	1.0(0.01)	1.0	1.0
Zinc	0.05	1.0(0.1)	1.0(0.1)	2.0	2.0
Nitrate	10	10	20	20	25
Nitrite	0.06	0.1	0.15	1.0	1.0
Ammonia	0.02	0.02	0.02	0.2	0.2
Total Kjeldal Nitrogen	0.5	0.5	1	2	2
Total Phosphorus	0.02	0.1(0.025)	0.1(0.05)	0.2	0.2
COD_{Mn}	2	4	6	8	10
Dissolved oxygen	90%	6	5	3	2
COD_{Cr}	15	15	15	20	25
BOD_5	3	3	4	6	10
Fluoride	1	1	1	1.5	1.5
Selen	0.01	0.01	0.01	0.02	0.02
Arsen	0.05	0.05	0.05	0.1	0.1
Mercury	0.00005	0.00005	0.0001	0.001	0.001
Cadmium	0.001	0.005	0.005	0.005	0.01
Chromium (6^+)	0.01	0.05	0.05	0.05	0.1
Lead	0.01	0.05	0.05	0.05	0.1
Cyanide	0.005	0.05(0.005)	0.2(0.005)	0.2	0.2
Phenols	0.002	0.002	0.005	0.01	0.1
Oil	0.05	0.05	0.05	0.5	1.0
Anionic surfactants	0.2	0.2	0.2	0.3	0.3
T. Coliforme Bact.			10000		
Benzo (a) pyrene	0.0025	0.0025	0.0025		

C.2.1. Pollution of Drinking Water Source

Songhuajiang River is an important drinking water source for the more than 25 mill. people living along the river. Yearly water requirement is as great as 150 million tons. Quality analysis of the drinking water at the inlet and outlet from the treatment plant, show that the organic pollutants of about 100 components contained in the river water do not change. That is to say, the traditional water treatment techniques can only get rid of bacteria and suspended substances in the water; they can not eliminate the contained organic pollutants.

Through an investigation done by Harbin Medical University of the people in Daoli, Nangang and Pingfang districts who drink Songhuajiang River water, we can the conclude that there is a direct correlation between drinking the polluted water and death rate of malignant cancer. The polluted Songhuajiang endangers the health of millions upon millions of people.

C.2.2. Great decrease of aquatic life and fishery output.

Songhuajiang River used to be a river full of life. According to records, there were 78 different species of fish as well as shrimps, shellfish, frogs etc. in the river. Since Songhuajiang is located in both the cold and temperate zones, many species from both cold and temperate water lived in the river, such as huso sturgeon, sturgeon, Wusuli white salmon, and chum salmon. In the fifties the fishery output of the river in the Harbin area was as much as 4370 tons a year. In the recent year due to the pollution, the rare species are extinct, and others are on the verge of extinction. The number of fish species are reduced to 48 (38,5%). The output of the fishery is also greatly reduced. At present the maximum output is 120 tons p.a. Especially in the period when the river is frozen with ice thickness of aproximately 1 meter, the conditions are even worse. In the water, already short of oxygen due to pollution, the fish death is increasing sharply. During the frozen season in 1993 the fish death was so serious in the rivers 700 km flow distance from the upper to the lower region, that a fisherman had a catch of 700 kg of dead fish in one day; and when the river melted, there were almost no catch at all, even after several turns with hundred meters long net. If no changes are made, Songhuajiang River may be a dead river.

C.2.3. Threat Against the Boundary River

At Tongjiang River (the lower areas of Songhuajiang River), Songhuajiang water flows into Heilongjiang River, which is the boundary river between China and Russia. The polluted water flows into Russia through Tongjiang and Fuyuan, and influences the life and economic development of Russian people. The Russian Government has suggested several times that China and Russia should make a joint effort to investigate the pollution of Songhuajiang River. Obviously, the pollution of Songuajiang River affects the relationship between China and Russia.

In order to protect the citizens health, and to fulfil the obligations of "United Nations Agreement of Diverse Biology" which our country have signed, and to ensure the economic development, it is an urgent task to renovate Songhuajiang River with effective measures.

Appendix D

Results from the water quality monitoring of Songhuajiang River in 1990.
Localisation of station 1 - 17 is shown on the map in Appendix E.

Songhuajiang River in Heilongjiang Province, China

Water quality data as mean values of monthly sampling in May - October 1990.

				Hardness	Diss. O2														
	Water T	R-pH	W-Sus	Hd	DO	CODMn	BOD5	NH3	NO2N	NO3N	V-Phen	CN*	As*	Hg*	Cr+6	Pb*	Cd*	Oil	W-Cond
			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	
National	Std. Cl.III	6,5-8,5	150		5	6	4	0,02	0,15	20	0,005	0,2	0,05	0,1	0,05	0,05	0,005	0,05	
Station																			
1		8,14	237	4,27	9,93	8,94	5		0,03	0,49	0,001	0,002	0,011	0,39	0,005	0,005	0,0005		8,9
2		8,04	216	3,15	10,4	6,7	5		0,011	0,15	0,002	0,002	0,008	0,4	0,003	0,005	0,0005		10
3		8,13	141,3	3,52	10,3	7,61	4,7		0,018	0,16	0,002	0,002	0,008	0,33	0,003	0,005	0,0005		10
4		7,73	81,6	3,15	10,1	7,37	2,71	0,006	0,015	0,28	0,001	0,002	0,002	0,22	0,002	0,009	0,0002		13,4
5		7,75	56,6	3,93	8,26	9,2	4,52	0,01	0,011	0,29	0,003	0,002	0,002	0,3	0,002	0,012	0,0002		14
6		7,9	107,6	3,63	9,36	7,87	4,18	0,007	0,014	0,53	0,001	0,002	0,002	0,4	0,002	0,008	0,0002		14,5
7		7,81	102,2	3,24	9,33	7,5	3,88	0,005	0,015	0,3	0,001	0,002	0,002	0,38	0,002	0,006	0,0002		14,3
8																			
9		7,39	294,9	3,06	9,36	6,83		0,001	0,028	0,5	0,017								111,1
10		7,68	13,7	3,23	8,64	5,01	3,74	0,003	0,015	0,2	0,001	0,002	0,004		0,002				
11		7,59	12,1	3,15	8,45	6,22	3,07		0,012	0,14	0,001	0,002	0,004		0,002				
12		7,63	12,9	3,29	8,71	6,21	3		0,015	0,17	0,001	0,002	0,004		0,002				
13		8,64	112,3	3,33	7,38	6,15	1,99	0,037	0,009	0,57	0,002	0,002	0,004	0,2	0,002	0,003	0,0001	0,12	15,4
14		8,69	135,1	3,48	8,5	6,24	2,77	0,049	0,005	0,5	0,003	0,002	0,004	0,2	0,002	0,003	0,00014	0,21	15,9
15		8,72	169,5	3,9	7,93	5,87	2,66	0,038	0,006	0,54	0,002	0,002	0,004	0,2	0,002	0,003	0,0001	0,16	16,2
16		7,44	109	3,56	9,01	8,51	5,91		0,041	0,6	0,001		0,004	0,5		0,005	0,0005		16,1
17		7,12	11	3,57	10,26	9,41		0,001	0,011	0,35									15,1
conc.	max	9,26	336	6	10,8	13,18	9,5	0,114	0,068	0,7	0,026	0,002	0,018	0,69	0,006	0,034	0,0015	0,5	
range	min	6,4			0,02			0,001	0,002	0,02	0,001	0,002	0,002	0,02	0,002	0,001	0,0001		

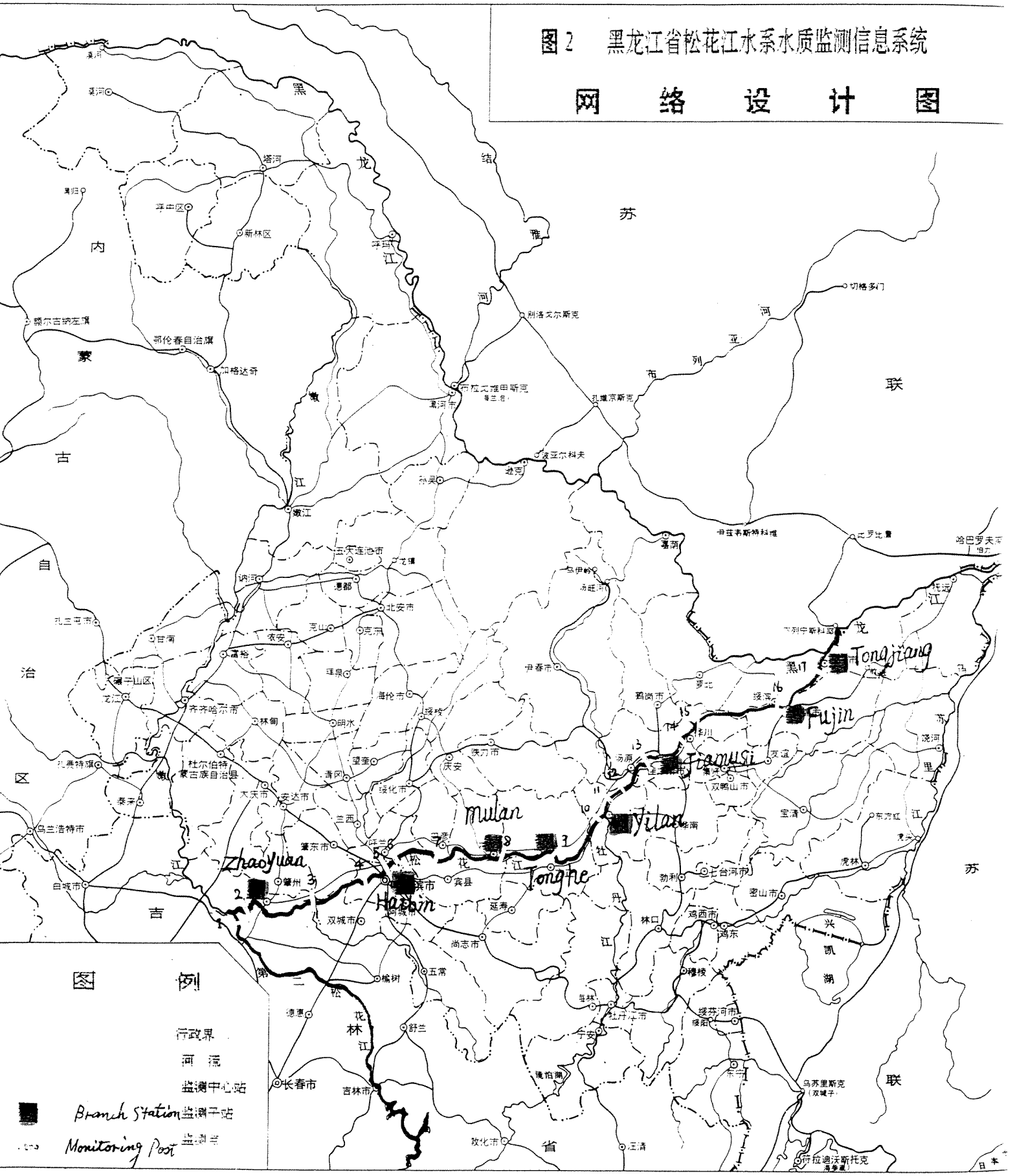
Appendix E

Map with localisation of measuring points in Songhuajiang River.

The station numbers in Appendix D giving water quality results from 1990, is showed on the map, indicating where the measurements were made.

图 2　黑龙江省松花江水系水质监测信息系统

网　络　设　计　图



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黑龙江省环境监测中心站　1991年8月

Appendix F

Population, sewage and wastewater discharge data for cities in the Heilongjiang Province

and

Statistical Information of Industrial wastewater discharged by the main industries in Heilongjiang Province

Table F 1. Population, sewage and wastewater discharge data for cities in the Heilongjiang Province

City	**Population (x 10^3)**	**Domestic sewage 10^3 ton/day**	**Industrial sewage 10^3 ton/day**
Zhaoyuan	155,5		0,1
Zhaodong	793,4		30,0
Harbin	3753	375,3	615,1
Mulan	124,9		1,5
Tonghe	90		14,7
Yilan	178,9		8,5
Tangyuan	140,6		2,5
Jiamusi	2019,2	201,9	490,0
Huachuan	101,7		1,0
Suibin	64,7		2,4
Fujin	407,5		35,6
Tongjiang	136,4		-
Data from (year)	(1990)	(1990)	(1985)

Table F 2. Statistical Information of Industrial wastewater discharged by the main industries in Heilongjiang Province in 1994.

Order	**Type of Industry**	**Wastewater million tons/year**
1	Pulp and Paper Industry	128,19
2	Power Steam Hot-water Production and Delivery	98,68
3	Mine and Selected Coal Products	93,41
4	Oil Processing Industrry	59,72
5	Ferrrous Metal and Metallurgic Industry	55,28
6	Machine Industry, a	40,47
7	Mine and Selected Non-ferrous Metal Ore	21,72
8	Chemical Industry	20,95
9	Machine Industry, b	18,86
10	Food Processing Industry	17,56
11	Textile Industry	16,68
12	Forage Processing Industry	14,0

The numbers are based on information from the whole province. Of the total amount given here 57 % is received by the main stream of Songhuajiang River.

Appendix G

Agreement for Technical co-operation between Norwegian Institute for Water Research (NIVA), Norway and Environmetal Protection Agency of the Heilongjiang Province

Agreement for Technical co-operation between Norwegian Institute for Water Research (NIVA), Norway and Environmetal Protection Agency of the Heilongjiang Province

§ 1 The Norwegian institute for Water Research (NIVA) and the Environmental Protection Agency(EPA) of the Heilongjiang Province (hereafter called the partners) have agreed to establish a permanent co-operation within the field of environmental surveillance and information.

§2 The co-operation will be launched through a joint project concerning the establishment of a Control System of Monitoring Information of Water Quality in Songhuajiang River System in Heilongjiang Province.

§ 3 A detailed project proposal will be developed by the partners including scope of work, time schedules, responsibilities, costs, funding and project management.

§ 4 Experts will be appointed in the Heilongjiang Province to participate in the development of the co-operative project including the following tasks:

1. Survey of existing data and monitoring programmes

2. Identification of the most important pollution problems and resources, and starting the establishment of discharge data bases

3. Define goals and objectives for the surveillance programme

4. Detailed planning of the surveillance programme and its accomplishment

§ 5 The two partners agree to exchange knowledge, experience, environmental data and reports concerning the topics governed by this agreement.

§ 6 One person from each partner has been appointed to be responsible for organising and preparing the follow-up project and programme.
From NIVA: Bente M. Wathne
From EPA of Heilongjiang Province: Chen Aifeng

§ 7 Both parts will work to promote the expertise and professional services available within the institutions, and will aim at offering the experience and data available to other areas of interest.

§ 8 Exchange of technical and scientific personnel may represent parts of the training programme

§ 9 During the main project (the first two years of this co-operation), seminars, workshops and annual meetings will be organised. During these meetings status reports, presentations of results and any problems, questions and further development of the co-operative work will be discussed.

§ 10 A total cost estimate will be developed based upon expenditures, NIVA support and local labour in Heilongjiang Province. Further financial support from NORAD will be requested from the EPA of the Heilongjiang Province based upon the final detailed project proposal.

§ 11 This agreement may be mutually amended at any time.

Harbin 23/11 1995
On behalf of EPA, Heilongjiang Province

Wang Jing Chun
Director

Oslo 4/12 1995
On behalf of NIVA

Haakon Thaulow
Director

Norwegian Institute for Water Research

P.O. Box 173 Kjelsås Telephone: + 47 22 18 51 00
N-0411 Oslo Telefax: + 47 22 18 52 00

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