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Guangzhou Air Quality Management and Planning System

Report, Workshop 1, 1997
Guangzhou, 21-25 April 1997

Steinar Larssen
Cooperation Project between
Guangzhou (GSTC, GEPB, GRIEP, GEMC) and
NORCE (NILU, IFE, CICERO, ECON)

Contents

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1 Introduction

After Sino-Norway Cooperation Project's kick-off seminar, the workshop was planned to hold in 1997. According to arrangement, the first workshop has been held smoothly in Guangzhou from April 22 to April 26 in 1997.

Participants

Norwegian side:
Mr. Steinar Larssen, Mr. Andy Yager, Mr. Fridtjov Unander, Mr. Knut Aarhus etc were present at the meeting.

Chinese side:
Mr. Wu Zhengqi, Mr. Yu Kaiheng, Mrs. Hu Shanyu, etc. from project leader group, Mr. Sun Dayong, Mr. Zhu Changjian, Mrs. Liu Qiaomei, Ms. Fang Xingqin, Ms. Su Xing, etc. from project office and every task group leader and its participants (refer to attachment list). The first plenary meeting was held on April 23, 1997. Status reports, modification of the detailed work plan, next six months plan and the problems need to be solved were presented by each task.

On April 24, 1997, both Chinese and Norwegian experts of each task group had a discussion which focused on problems existing in each task and technique puzzles. An explicit plan was made for next stage.

From April 25 to April 26, the negotiation meetings with Norwegian experts were hold between task 1, 10, 11 and l3, task 2, 7, and 8, task 6-1, 6-2, 6-3, and 9, respectively. They exchanged the ideas that how to coordinate the relative tasks.

On April 24, 1997, project leaders of both sides and the leaders of GSTC had a consultation about the contract signed during the kick off seminar this year. An agreement as a supplementary was signed after the consultation, which definite the instrument and facility list provided by Norway, the personnel training plan in 1997, and the modification of project organization. The ability of the project management group was enhanced.

2 Workshop Program

Before Wednesday, 23 April

Task-specific work. Plans to be made and carried out by each relevant Task group.

23 April, Wednesday

Chairman:	GZ director of the technical group and NORCE leader
Time:	8:30-1 2:OOam (1 0:15-1 0:3Oam tea break) noon, lunch at GRIEP canteen
	2:00-5:00 pm (3:15-3:30 pm tea break)
Place:	The big meeting room on the 3rd floor of GRIEP Building

Task reports, Tasks 1-12 (14 tasks altogether, include the 3 subtasks under Task 6, Damage).

Preparations:

A Status report is to be written for each task (a separate report from each of the GZ and NORCE task partner). The status reports shall cover the following:

1. Work performed as pr. 31 March, 1997 (with background in the DWP)
2. Modifications to the Detailed Work Plan (if relevant).
3. Plans for the next 6 months.
4. Problems?, regarding
   - capacity
   - budget
   - training
   - information
   - communication /coordination
   - within the task (In GZ or between GZ- NORCE)
   - with other tasks.

   Proposals for solutions to possible problems.
5. Exchange: Plans for training stay in Norway: Person, time, contents.

Each Status report should be brief (1-4 pages, dependent upon work done).

Under each Task, the following should be presented briefly:

1. The Status reports
2. The task-specific reports, scheduled for completion at the Workshop 1,1997 (if any), as described in the Detailed Work Plan of the Task.

The presentation of each Task status will probably take 0.5-1 hour.

Each Task team should (must) be present at the presentations of other Tasks closely related to their own Task. Otherwise, the teams should be free to continue specific task work (or be free for work unrelated to this project).

All project leadership persons present should be there during the whole session.

24 April, Thursday

Continued Task reports

25 April, Friday

During Friday (and possibly during Thursday afternoon, if status reporting finishes early enough), the following topics should be covered;

1. Totality of the Detailed Work Plans (DWP).
   Discussion of the program as a whole, and the priorities as they emerge from the DWPs.
2. Coordination Issues:
   Discussion of issues that may have been raised during the first 2 days.
3. Exchange program: Discussion based upon the proposal from GZ.
4. Issues re. project organization/administration
5. Contents/preparation of the Workshop report.
6. Next Workshop: Time (October) and contents. Preparations.

At the end of the meeting, spare about 2 hours to have a summary-up session

Dinner, entertained by GEPB and GSTC

26-29 April (Saturday-Monday)

During this period, special discussion about the relationship between Tasks 10 and 11 (after the arrival of Mr. Haugland).

During this period, also the work on the contents of the Workshop report should be continued.

Also, continued Task work for those still in GZ.

3 Participation

From Chinese side:

Gang Haizhang	GEPB	Zhou Yizheng	GSTC
Lie Zengbiao	GEPB	Liu Zhengyong	GSTC
Luo Yukuan	GSTC	Huang Zhigang	GEPB
Hu Shanyu	GEPB		
Chen Zhenhao	GZ Foreign intelligence import Office		
Wu Zhengqi	GRIEP	Yu Kaiheng	GRIEP
Pan Nanming	GRIEP	Zhong Jieqing	GRIEP
Sun Qun	GRIEP	Fang Xingqin	GRIEP
Cui Xia	GRIEP	Weng Shifa	GRIEP
He Liangwan	GRIEP	Li Zhiqin	GRIEP
Fan Changzhong	GRIEP	Zhu Changjian	GRIEP
GeYi	GRIEP	Liarig Yujie	GRIEP
Tian Kai	GRIEP	Lin Nisheng	GRIEP
Wang Boguang	GRIEP	Yu Jichan	GRIEP
Kuang Junxia	GEMC	Huang Qingfeng	GEMC
Dong Tianming	GEMC	Huang Zhuzhao	GEMC
Sun Dayong	GEMC	Song Weiping	GEMC
Wu Qingzhu	GEMC	Shuang Jurong	GEMC
Mo Xiouzhen	GEMC	Liu LI	GEMC
Fu Chun	GEMC	Su Xing	GEMC
Chen Yang	GEMC	Xun Qi	GEMC
Hu Guiping	GEMC	Chen Chan	GEMC
Zhang Xiaogang	GEMC	Jian Jianyang	GESI
Liu Qiaomei	GRIEP		

From NORCE:

Steinar Larssen	NILU	Dag Tonnessen	NILU
Fridtjof Unander	IFE	Andrew Yager	IFE
Torleif Haugland	ECON	Knut Aarhus	ECON

4 Summary Reports

Report collection

Every task group debriefed its research status in this work meeting, which included five contents as follows:

- Finished work before 31, March, 1997;
- Modification on detailed work plan;
- Plan for next six months
- Problems
- Exchange plan

According to all debriefed results, it would be arranged as follows:

a. Every task group has done much work on the research object, problems need to be settled and the work plan for more than half a year. Both Chinese and Norwegian sides have a basic agreement on how to finish this project now.
b. Task 1, task 6-1 and task 10 have made earlier progress than the others. The rest tasks are still in the phase of discussing subject, collecting data, visiting related units and consulting. The practical works haven't been started due to the original plan and the budget.
c. About a half of tasks modified their work plan but not much modification.
d. Every task will finish the next six months work according to the whole year work plan.
f. Common existing problems: less participants; computers and the budget should be provided as soon as possible. Moreover, the relationship between some tasks is not clear so that it is difficult to practice the plan.

Functions:

There are quite positive functions through this workshop hold at GRIEP in April 1997. Three main aspects are following:

a. To harmonize relationship

Through this workshop, the project leaders of two sides formed many common acquaintances on how to further develop the cooperation project deeply, how to unify and promptly feed back problems found during the work. Then a good effect was achieved. The relative problems included not only Sino-.Norway relationship but also the relationship among task groups. After experts of each tasks discussed in their task and with the relative tasks, an explicit answer and harmonization had been formed to those uncertain or unclear existing cooperation problems and relationships originally. There is a good base for each task to develop work successfully.

b. To clarify task 13 work further

Organization, coordination and administration of each task must practice according to the total project plan. The leadership of project is in charge of the arrangement including the total project design, budget and personnel plan. Total task group is in charge of cooperation relationship and status work check of every task group. Project office is charge of everyday administrative work. Task 13 group is composed of the project leadership, total task group and project management office. Project office is the abbreviation. A common acquaintance on

the composition and work content of task 13 has been made in this workshop. Task 13 acts as a very important role and is necessary to develop our cooperation project smoothly.

Meeting Documents

After the workshop, each tasks finished arranging their related status reports, plan modification report and meeting minutes and compiled them into meeting documents to send in the related departments.

5 Status Reports

5.1 Work by Guangzhou and NORCE, November 1996 - March 1997

Task 1. Emission inventory

PROGRESS REPORT

1 Before March 31st 1997, the following work had been finished:

(1) On December 30th .1997, Summarized the work done during the kick-off seminar, and defined the work plan of task 1 (just a draft)

(2) In January 1997, according to the requirement of work, the personnel arrangement was defined. Task 1 consists of three main units in the environmental protection system.

(3) In January of 1997, task group began to clean-up the division of labour. As a work rule, with the emphasis on division and cooperation.

(4) In February of 1997, according to the requirement of technical group and project office, corrected the work plan, and put emphasis on the cooperation among the task groups.

(5) In February of 1997, task group carried out some preparations, and do some adjustment according to the characteristic of task l, and arranged for Mr. Gram's coming, including the time schedule and the content for discussions.

(6) In March of 1997, collected the categories of the existing data of different sources. (Industry, Domestic, Mobile sources. etc.)

(7) From March 12th to March 19th had some discussions about how to collect the data with Mr. Gram. During his stay in GUANGZHOU. Mr. Gram introduces how to use the module, and defined the scope of investigation and the net works with the technical group.

(8) On March 21st. submitted the working summary.

(9) On March 21st. the project office confirmed the Cartesian coordinate system, the scope of investigation and the two networks.

(10) From March 20th to April 10th according to the requirement of collecting data, finished the division of the task and confirmed the detailed working steps and time schedule, and presented the detailed work scheme to the project office.

(11) Before March 31sf. 1997, draft the questionnaire for industry source.

2. Correction for the DPW (the detailed work plan)

Through preliminary discussions, there is not consideration about construction site for the moment.

3. During the next six months:

From April to June in 1997, begin to collect the data about industry source, domestic source and mobile source, give emphasis to deliver the questionnaire, and define something about energy.

The work plan is shown. (From July to December. 1997), as following:

CONTENT	**Schedule**
From July to December, 1997	
1.Industry source	
(1) to sort out data	July/August
(2) to define the emission factors and input data to establish the database	August/October
(3) time variation	September
(4) define the point source and area source (calculation with module	November
(5) energy consume in each grid (calculation with module)	December
2.mobile source	
(1). time variation (AADT)	July/August
(2). to sort out data	August
(3). to input data to establish database	September/October
(4). to calculate the pollutant concentrations.	November
3. Domestic source	
(1) time variation	July
(2) the population distribution in each grid. (the whole scope)	August/September
(3) energy consume in each mid (the whole scope)	October/November

4. Some problems:

(1) Ability: passable, but lack of the equipment for necessary data-processing, and shorthanded to input so much data, so it is desirable to augment the staff when inputting data.

(2) Cost:

1) Purchase computer.

2) Cost of cooperation when getting some information.

(3) Training:

1) when the collecting work has been nearly finished, it is necessary for us to have some training in use of computer to calculate.

2) if possible, it is desirable to get some information of how to carry out investigating pollution source in the other countries or areas.

(4) Data and information:

1) provide the related detailed calculation module and formula, (in written form

2) provide a reading report as an example to show the form of the result of emission inventory.

(5) Communication/Coordination
with NORCE: nothing requested.

With the other task groups or Chinese counterpart: get assistance with the other tasks.

REMARKS: NO modification to the detailed work plan of 1997, so not to submit it this time.

TASK 1
20 April, 1997.

5.2 Status report, NORCE (by Mr. Frederick Gram, NILU)

1. Work performed 1st quarter 1997

Due to many technical problems arising during the beginning period of the project, Mr. Gram was asked to come to Guangzhou in March in order to direct and adjust the work of the project. During one week we discussed the different source groups and their need for basic data, and how the data should be put into the different KILDER programs to calculate emissions. We also discussed the AirQUIS emission module, the main difference is that AirQUIS calculates emissions based upon the input data to the K1LDER system, but with a time variation module in addition. There were no actual data from Guangzhou available, so data from the Hungarian town Pécs were used as examples. A draft to a travel report is made, describing lots of details from the discussions.

The area for the calculations was discussed. Figure 1 shows proposed areas which are in accordance with the seventh 5-year-plan, with an area of 52x56 km with a 2- km-squares, covering most of Guangzhou city. grid. For Central Guangzhou it will be necessary with a denser grid, and for the model calculations a grid between. The exact coordinates for the lower left corner of the grid coordinate system must be measured out, this will be the basis for all location references in this project. It will also be necessary to establish rules and formulae for transformation of the coordinates already measured out in the GIS-systems at GEMC and GR1EP.

2. Modifications to the Work Plan

The Work Plan will have to be modified with more weight on the three major source groups:

- fuel consumption
- industrial point sources
- road traffic

in addition, some estimates for the groups construction and other mobile sources (airport, harbour) has to be made.

Figure 1: Proposed areas for emission calculations and modeling in Guangzhou

The task has connections with several of the other tasks, and it is important that the Project Office will handle problems with task dependencies. The population distribution is assumed to be within task 5, but it is needed for the distribution of domestic fuel consumption and emissions. The fuel use in industry and domestic use has to be studied in cooperation with task 2 (and task 8), and the development in the traffic with task 8.
Some work (and resources) may be moved from one task to another.

3. Plan for the next 6 months.

Mr. Gram will come to Guangzhou in June/July, and in the meantime lots of existing data should be collected, as described as a proposal in the travel report. During the next stay actual data from Guangzhou will be used as input to different KILDER-programs, and the first emission estimates~ will be prepared. The emission will also be used together with meteorological data from Task 3 to the first long-term concentration calculations with the KILDER models. The results of these will be of importance for the future work, which sources are most important where?

After the June/July visit we presume that there will be need for some corrections in the data, but these has to be specified at that stage.

4. Problems.

Until March, the most serious problem seems to be uncertainties with the use of the different programs in the KILDER package. After the kick-off-seminar there was held a mini-seminar at GRIEP, but few from the task 1-group was present. We hope that this is solved now. The questions regarding dependencies and who is going to do what mentioned in Section 2 has to be solved during the Seminar.

In the proposal to DWP for the task we have not discussed difficulties with availabilities for detailed data. In order to get a correct survey of the spatial distribution in the use of different fuels it is important to have data for as small regions as possible. It is also important to have very detailed data for the point sources, in the DWB it is proposed to give questionnaires to all enterprises that are paying emission fees or equivalent. The information for the point sources has to be secret, but available for the Project. The GZ task group has to get assistance to collect the different types of data needed.

5. Exchange

For the training program Ms. Su Xing is supposed to come to Norway for training in connection with both task 6-3, vegetation damage, and task 1, emission inventory. Ms. Su was interpreter during the visit in March and showed deep knowledge in problems concerning emission inventories. It is important with a good collaboration between the emission and the modelling tasks, and it will be useful if she comes to Norway at the same time as Ms. Fang. We will suggest that the best time will be the period from the middle of September to the seminar in GZ in October. Ms. Su will spend part of the time at CICERO, part of the time at NILU.

Task 2. Energy use and coal smoke pollution

TASK 2 ENERGY CONSUMPTION AND COAL SMOKE POLLUTION

Status Report

After the kick-off seminar, based on requirement of the project, a Project Office and Technical Team was established by GZ Environmental Protection Agency to be the link between GZ and NORCE. Under the leadership of the technical team directly, Task 2 has finished work plan and are going to implement it.

Now we report for main activities done recently:

1. To define the scope of the information collected
   (1) Investigation area
   According to current situation and long-term program of Guangzhou, investigation area of Task 2 should be: west from ShunDe city LongJiang town, east to PanYu city LianHua mountain, south from FoShan city, north to HuaDu city. The area is east west 52km X south north 56km, involve 9 districts, i.e. Dongshan district, Haizhu district, Liwan district, Yuexiu district, Huangpu district, Tianhe district, Fangcun district, Baiyun district, economic development district, four city of town, i.e. Huadu city, Conghua city, Panyu city, Zengcheng city. In it the emphasis is west from Fangcun district, north to Baiyun district, of which area is 140 km^2.

   (2) Criterion year: the year of 1995

   (3) S cope of information collected
   First-hand information including every coal-fired boilers, furnaces, ovens in enterprises, factories, service industry, families within the area.

2. Part of relevant data such as power plant energy consumption data are collected, and some inventories as well as tables are available to collect energy consumption data. In addition we have consulted associated information and documents to carry out the work plan. In accordance with the outline required from project office and last work plan, we made the following modification on the detailed work plan after discussion over and over. The work plan should be conducted by the following 4 subtasks:

2.1 To collect and sort out data for energy structure, coal consumption, coal smoke pollution.

2.2 To investigate current situation of energy use focused on coal consumption and forecast development in 2000 & 2010, implemented by energy balance information and emission inventory collection, on which emission level calculation base.

The input and output data including the following 4 categories:

A. Investigation data for pollution sources and energy (Task 1 and Task 2 are responsible)
B. Current monitoring data and forecasting data of air environmental quality (Task 3 and Task 4 are responsible)

C. Statistic data for social economic and treatment technology data (Task 8 are responsible)
D. Statistic data for energy supply and consumption, forecasting data for industrial coal use demand (Task 2 are responsible)

2.3 Candidate options for coordination relationship of energy and environmental.

By the description for current situation of energy consumption, to define options for pollution abatement, according to GZ economic development program arid industrial plan. The candidate option submitted clearly with pollutant abatement amount and associated control cost. This analysis includes electricity assessment and output to Control Option. Some power plant located outside GZ should be studied also if necessary. (This subtask should be implemented base on forecast data input from Task 8).

2.4 Based on the data for energy balance, existing coal-fired technologies as well as future control options, to research typical coal-fired boilers and output all these data to Task 7.

3. The arrangement for the work of next 6 months will be carried out by the following 3 activities.

1	May - August, 1997	continue to collect associated energy consumption data and consult relevant documents
2	September - December	collect and sort out pollution source data from inventory including other relevant material to he analysed that output to Task 7
3	June - December	research for typical power plant and industrial furnaces and provide basic data for candidate options

4. Related task group and data

Subtask No.	input from	data to be submitted	submitted data
2.1	Task 1	see 2.1	September 1997
2.2	Task 2	see 2.2	December 1997
2.3		see 2.3	June 1998
2.4		see 2.4	October 1998

5.3 Status report, NORCE (by Mr. Fridtjof Unander, IFE)

Task 3. Dispersion modeling

Status report, Guangzhou

1. Work performed as pr. 31. March.

The sub tasks which span over the period from the end of 1996 to March, 31 1997 include sub tasks 1,2,3,7,13,14,15.

For each of these sub tasks status is as following:

1 (from Dec. 96-to- Aug. 97, responsible GRIEP Cui) GRIEP has collected some existing digital map data, no conversion and adaptation of these data is done. Conversion method isn't decided by both sides.

2 (from Mar.97 to May 97, responsible GRIEF' Fang) in the middle of March, during the NORCE expert Mr. Gram's visit, the research area, as well as the coordinate and grid system is agreed. On the basis of this we decided collecting area of topography data, this is very important.

3 (from Mar. 97 to June 97, responsible GRIEF' Fang). We asked NULU in an email on March 13 to give us a detailed list of necessary meteorological data for different models. We received the specification of the necessary meteorological data on April 17. We also tried to collect the full specifications about the meteorological data in the introduction document of KILDER V2.O by NILU. We are on the status of preparation.

7 (Dec. 96, responsible NILU Gram) During the kick-off seminar, we received a set of executive files (total 25) and an introduction document of the model KILDER (dated on Oct 96), and also received 2 days of training. During Mr. Gram's visit in March 97, we received a new set of executive files (2 new, total 27) and the revision (Feb. 97) of the introduction document. When we read the document, we found that there were some files which were included in the document but not found in the two sets of files from NILU, for example, ISO-PLO.EXE and ROAD-RLO.EXE. So if not all of the necessary files of the KILDER have been installed in GRIEP, we can't say that the subtask has been finished.

In addition, we inquired of NILU through e-mail about the definition of 'installing of models', and hoped NILU provide more information about the model so that GZ could have the qualification to update the model in the future if necessary, for example, the original programme, error code. We really hope NILU deliver source code when they transfer the model tools to GZ, because this is very important according to the forth objective of the cooperation project—Transfer tools and knowledge to the extent necessary to enable GZ counterparts to continue the air quality management strategy work in a qualified fashion. This needs to be discussed.

13 (Dec.96, responsible NILU Ruse) During the kick-off seminar, NILU achieved sufficient information about the existing hardware and software at GR1EP at this point.

14 (from Jan. 97 to Jan. 98, responsible NILU Riise) before March 31, GRIEP didn't receive the proposed solution from NILU. (On April 1 7,we received the status report 1 for task from NILU, in which included the suggestion of complete hardware solution, see NILU report. We haven't discussed about the detail in GRIEP by now)

15 (from Jan.97 to Jan. 98, responsible NILU Ruse) Before March 31, GRIEP didn't receive the proposed solution from NILU. (On April 1 7,we received the status report 1 for task from NILU, in which included the suggestion of complete hardware solution, see NILU report. We haven't discussed about the detail in GRIEP by now)

2. Modifications to the Detailed Work Plan

Please refer to the revised Detailed Work Plan.

- Two new tasks (27 and 28) have been added for the writing of Detailed Work Plan for phases 2 and 3 respectively. This is done mostly to obtain an overview of the full extent of the task work.
- NILU resource estimates are modified or given for sub tasks 1,5.6,7,8,9,12,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28.
- Some minor adjustments in the sub task descriptions have been made.
- Delete the item 'identified problems.

For more detail, please refer to the revised Detailed Work Plan

3. Plans for the next six months

Plans are as given in the revised Detailed Work Plan.

4. Problems

1. NILU once indicated in a fax that AirQUIS can use Windows 95 or Windows NT, GRIEP selected Windows 95 for the 2 Pcs of task 3 according to the local condition. However, in the software solution sent from NILU on April 17, NILU required that Pcs running AirQUIS should use Windows NT. It's a problem now.
2. Regarding the KILDER model, NILU said the model has been installed in GRIEP. But, if not all of the necessary files of the KILDER have been installed in GRIEP, we can't say that the subtask has been finished.

3. We hope NILU deliver source code and more information about the models when they transfer the model tools to GZ so that GZ counterparts could have the qualification to update the model in the future if necessary, for example, the original programme, error code. This is very important according to the

forth objective of the cooperation project—Transfer tools and knowledge to the extent necessary to enable GZ counterparts to continue the air quality management strategy work in a qualified fashion. This needs to be discussed.

4. When we both sides make the complete technical software and hardware, we should clarify which is covered by NORCE costs, which is covered by local costs, which is supplied freely by NILU; which is to be purchased in open market, which is designated to be purchased from NILU.

5. Exchange

N1LU suggest two exchange visits to NILU for the Guangzhou task leader for task 3. The first should be in August or September, for learning about the NILU dispersion models ROADAIR and EPISODE, and to answer any questions regarding the model KILDER. The next visit should be during the first half of 1998. It's subjected to the project leaders' ratification

5.4 Status report, NORCE (by Atle Riise, NILU)

Work performed as pr. 31. March.

The sub tasks which span over the period from the end of 1996 to March, 31 1997 include sub tasks 1, 2, 3, 7,13,14, 15.

For each of these sub tasks status is as following:

1 NILU has not yet received any map data. There is therefore no work yet performed on the conversion and adaptation of these data to the ENSIS system.

2 NILU has not yet received any topography data, or any request regarding the area specification for data collection.

3 GRIEP has received the specification of the necessary meteorological data. The final specifications were given just prior to Workshop 1. However, some specifications are given in the KILDER users guide and the relevance of different data was discussed during the kick-off seminar.

7 The model KILDER is installed at GRIEP, and training has been given. Sub task is completed.

13 NILU has sufficient information about the existing hardware and software at GRIEP at this point. We would appreciate to be informed about any changes in this situation.

14 NILU has discussed the complete hardware solution and arrived at the following suggestion:

- NILU will purchase the PC server

- We would like to have one of the client machines brought to NILU prior to or in connection with the training in the use of AirQUIS at NILU. This should probably be one of the two PCs that GRIEP has already bought. This will enable NILU to perform any necessary updating of the client machine at NILU, which will give us better knowledge about the required updating of other client machines at GRIEP.

- NILU will purchase one hub, a few metres of cable and other necessary network equipment, so that we can connect the server to a specified number of client PCs in one room at GRIEP. This network configuration will first be tested at NIW during the AirQUIS training period.

The server and client RC5, as well as the above mentioned network equipment, will be transported to Guangzhou in connection with the installation of AirQUIS at GRIEP.

If the Guangzhou partners agree in this strategy, this sub task may be regarded as completed.

The above scheme results in a network of PCs running AirQUIS, where all PCs are located in the same room. GRIEP has asked NILU to suggest a network configuration for the whole of GRIEP. Our suggestion is:

- Cable: TP Category 5 (This can handle at least 100 Mbits)

- Network protocol: TCP/IP (software can be the integrated NT network on Windows NT machines and LAN Manager clients on any DOS-PCs)

- Network card and Hub’s from 3Com

To establish such a network, is important that some GRIEF personnel have the necessary qualifications. This network would of course enable several users to use AirQUIS from PCs in other rooms at GRIEF than where the server is located.

15 N1LU suggests the following:

- Operative system: Using Unicode requires Windows NT (Win 95 may support Unicode in future releases). Since AirQUIS uses Unicode to implement multiple language functionality, this means that PCs running AirQUIS should use Windows NT. The server must at any rate run Windows NT.

- Database system: Oracle for Windows NT

- 32-bits ODBC drivers for Oracle

- SQL net

- ArcView or ENSIS conversion module for conversion between MapInfo and Arcinfo formats. This is assuming that there is money in the Guangzhou part of the project budget to purchase any of these items.

NILU will purchase and bring all this software in connection with the installation of AirQUIS.

If the Guangzhou partners agree in this strategy, this sub task may be regarded as completed.

In addition, some work is done in the area of task administration, and particularly with respect to budget clarification and adjustment.

Modifications to the Detailed Work Plan

Please refer to the revised Detailed Work Plan.

- Two new tasks (27 and 28) has been added for the writing of Detailed Work Plan for phases 2 and 3 respectively. This is done mostly to obtain an overview of the full extent of the task work.

- NILU resource estimates are modified or given for sub tasks 1, 5, 6, 7, 8, 9,12,14, 15, 16, 17,18,19,20,21,22,23,24, 25, 26, 27, and 28.

- Some minor adjustments in the sub task descriptions have been made

For more detail, please refer to the revised Detailed Work Plan

Plans for the next six months

Plans are as given in the revised Detailed Work Plan.

Problems

1. The revised Detailed Work Plan reduces the cost associated with work performed by NORCE personnel during the entire project period. These costs are however still exceeding the task budget. I feel that it is not possible to reduce any of the resource estimates further. However, we will have to keep a sharp eye on the use of resources, and try to save wherever we can. The plan must be revised every year, in such a way that the planned sub tasks may be performed within the task budget.

2. Regarding sub task 11 on collecting complementary map data. The work in this sub task does not include any further conversions from MapInfo format to Arcinfo format performed by NORCE. It is assumed that prior to the execution of this task, the Guangzhou partners have acquired software to perform such a conversion. NILU suggest the purchase of ArcView for this purpose. NILU can deliver this ArcView Licence, but the expense has to be on the Guangzhou budget. It may be that suitable conversion functionality will be developed for

A1rOUIS within one or two years. At this point, this is not certain. If it is developed it can be delivered against a small licence fee. The advantage of using this module would be that it would not be necessary to develop knowledge of the software ArcView for the conversion purpose only.

Exchange

We suggest two exchange visits to NILU for the Guangzhou task leader for task 3. The first should be in August or September, for learning about the NILU dispersion models ROADAIR and EPISODE, and to answer any questions regarding the model KILDER. The next visit should be during the first half of 1998. The exact dates should be discussed in connection with the Detailed Work Plan for 1998.

Task 4. Air quality monitoring

Status report. Guangzhou

1. There is not any change for the work plan of 1997 for the time being.

2. Progress report
   What we have finished by the end of March is as following:

2.1 To describe substations
2.2 To supply the air quality analysis data to NILU in English
2.3 To investigate the market of the 03,PM1O and the meteorological monitoring equipment about their type, character and price. The results will be supplied in the workshop in April.

3. Discussion items in the workshop during 21--25 in April
3.1 The results what we have finished
3.2 Equipment purchase arrangement and the schedule

3.3 The work plan for the next phase
3.3.1 To finish the evaluation of Guangzhou existing air quality automatic monitoring system and the report
3.3.2 To develop the research on the optimization of the air quality auto-monitoring net
3.3.2.1 To consider the demand of the urban development (the urban planning)
3.3.2.2 To consider the demand of the air quality monitoring development: new standard, new regulations and improved monitoring items
3.3.2.3 To consider the demand of the air quality forecasting

4. Explanation of the staff-hour evaluation
4.1 The unit of the staff hour is “person, week” after considering the division of the labour and the cooperation that includes meetings, discussion, investigation and consulting.
4.2 From the view of the auto-monitoring system, it is expected to arrange special people for regular monitoring, maintenance of the substations, regular calibration and the other work group so that it is regarded to need 1.5 staff to continue the regular work. The unit is “person, week”

Task 4 AIR QUALITY MONITORING
INSTRUMENTS AND EXCHANGE PROGRAM

MEETING PLACE:	Guangzhou Environment Monitoring Center
MEETING TIME:	28, APRIL 1997
PARTICIPANTS:	Mr. S. Larssen, Mr Dong Tianming, Mr. Song Vv’eiping, Mr. Sun Davong, Mr. Wu Qingzhu, Mr.Huang Zuzhao. Ms.Hu Guiping, Mr.Chen Hong (Some more people were present at the beginning and during parts of the meeting).

PURPOSE: To go through the project status in detail, the status of equipment purchase, and the coming work.

1. Network description
   The station description tables had been filled out completely for all the 6 automatic stations. But tables had not been filled out for the many manual stations.
   Due to the new standards from NEPA, many of these stations may not be continued. Still, it is necessary to know the classification of these stations, because in the process of evaluating the network and proposing a new network. NILU need to look at results from all monitoring stations, and to know their classification.
   The sampling program for the manual sites is as follows: SO_2, NO_x, CO, TSP. 5 days each quarter (same day at all stations) 4 x 1 hr. sample, and for TSP: 1 x 8 hr. sample, medium volume (100l/min., gravimetric). GZ team will fill in the station table also for the manual stations in a simplified manner: Site class. Zone characterization. Pollutants measured. Station environment (brief description).
   To make an overview of the monitoring network GZ team should fill in the "Site summary description table". The essential data taken from the station tables will be filled in on only one line.

2. 1995 air quality data
   Tables, figures and maps had been prepared as described in the workplan. Good work had been done, and the data were very interesting, especially the hourly data presented for an- chosen day. These data showed interesting daily variations in the concentrations. Because of this, NILU requested that hourly data be presented for a full week around the chosen day (95/12/13). To be able to explain the variations shown, it is necessary to also show the meteorological data, which will have to be acquired from the Met. Office.

   NILU request that GZ team will provide data plots of hourly data for one week around the 1 3 Dec. 1995 for the stations and compounds already chosen Met. Data (wind speed. wind direction, temp. (hourly). RH (8 hourly), GMT data on stability (if available. 2 times a day). It would be good if the data files used to plot the time series (excel files could be sent to NILU. so that NILU could also plot the data in various ways ourselves.

   After this has been done. GZ team must, as written in the Detailed Workplan, make a brief report out of the collected material (the tables. figures and maps. with a brief text binding the information together, and referring to the Detailed Workplan). This report should now be available by 30june, 1997.

   To be able to evaluate the network and propose a new network, NILU request to look at the data in the annual reports from GEMC, and request the needed parts of the reports through the Project Office. Meanly, NILU request GZ team to copy the air pollution parts of the 1994 report, the 1990-1995 report, and provide translation of the headlines, all the text on figures and tables, through the Project Office.

The new national standards do not change the level of concentration, but requires a higher frequency of monitoring, at 12 days per month, more than 1.8 hours per day. This is t-he same as requiring continuous monitoring. Spatial density: at least one station per district. This is not requirement in the standard, but is proposed by GEMC. Compounds: SO_2, NO_x, CO, TSP. In addition PM_{10} if possible, also O_3 if possible. The standard do not require PM_{10} and O_3 monitoring, and no standard on NO_2, only NO_x.

The time schedule in the DWP for finalizing the proposal for a new network (31 Dec. 1997) is OK. The presentation of the modified plan will be the responsibility of GEMC. GEMC can refer to this project and the process leading to the proposal.

3. Instrument purchase plan
   After receiving offers from various companies. GEMC has decided for Thermo Electron, same as they have bef6re: The prices are comparable to the API offer in Yantai, although a hit higher. GEMC want to modify the proposed purchase list as proposed from GRIEP, with more NO_x and less SO_2 and CO. This is to replace existing, not functioning monitors. This is up to the GZ side to decide.

   About meteorological tower: The Met One purchase does not include a met tower. This is necessary to include in the purchase list. The height of the tower depends upon the chosen site for the met-station. Mr. Tønnesen should visit GZ soon, a.o. to decide in detail on the site for the met-station. One site has been proposed by GEMC: N. of Pear river, by bridge no.3, from East. GEMC will take photos and send Mr. Tønnesen. Tønnesen should also evaluate which stability parameter should be included in the Met One purchase.

4. Relation to other tasks
   NILU reminded themselves about the relations between Task 4 and the other tasks. Especially important is the relation to Task6 (Effects on health, materials and vegetation. They depend upon air quality data Task 4.

   There should be called a meeting between Task 4 and Task 6.1, 6.2 and 6.3. The Task 6 is erger to hear how Task 4 will provide for them the data they need. Mr. Sun will be informed about this by Mr. Dong so that the Project Office can call such a meeting.

5. Research background station for GZ
   The question of the necessary of having a background monitoring station (outside the city) in this study was raised by GEMC. The answer is that this is very important, because the possibilities for reducing the air pollution in GZ is very de2endent upon how large is the background pollution contribution relative to the contribution from the local emissions. For most compounds it is clear that the local contribution is dominating, but for PM_{10} and O_3 the regional background concentration is of importance. The need for a background station is a problem, because under the new national standard, GZ is obliged to monitor at as man' station inside the city as they can.

However, for PM_{10} and O_3, they are only obliged to monitor “to -the extent possible’. It must also be said that measurements of the background pollution is important also for the future continued air background station for a period of about a yea r as part of this project.

The location of a background station will be selected during the coming visit of either Mr. Tønnesen or Mr. Gram. PM_{10} and O_3 measurements should start as soon as possible (also of interest for the -material and vegetation damage projects). NO_x should also he measured, if possible with old monitor.

6. Pilot study on special analysis
When planning this project, it was thought that there would be a need to do some special small-scale studies on specific air pollution topics which have not been investigation in GZ previously. In such a case, pilot studies should be performed, to investigate the importance of the issue -in GA to enable improvements of project.

Such issues, which are not part of the project plan so far, includes chemical analysis of PM_{10} samples, to study especially the role of (regional- and local-scale) sulfate and nitrate particles. There should also be made benzene measurements of ambient air. Benzene is carcinogenic, and probably represents an air pollution problem in GZ.

Lassen prepares a project plan for a pilot study on such issues. GZ agreed to take part by doing the practical work research, set-up of instruments and samplers, changing of samples, and so on, and by commenting on the report. Costs related to this which are additional. Relative to the project plan so far, can he paid by the budget for this pilot study. GZ team will finalize the pilot project plan together with NILU and estimate their additional costs.

7. Work in coming 6 months
This should follow the detailed workplan, with necessary modification.

Equipment purchase: Monitors shall be bought according to the offer from Tek equipment. GZ leadship decides what to buy. Orders should be made as soon as possible. The GZ leadship should make sure a smooth and fast procedure through the SSTC. The met. mast must not be forgotten.

Network modification: Work will proceed according to the DWP.

Training at NILU: Mr. Dong is scheduled to come to NILU in September, Mr. Dong makes a list of the topics he would like to be covered during his stay.

Training in GZ: The need for NILU instrument / monitoring experts to come to GZ will he clarified during the training session in Norway.

5.5 Status report, NORCE (by Mr. Steinar Larssen, NILU)

1. Work performed 1. Quarter, 1997

According to the workplan, and as part of the subtask 1, "Detailed description of existing network", a Station description scheme was designed and sent to the GZ task leader, before the end of January (somewhat delayed). The scheme consists of 2 pages, for introducing all relevant information about each of the existing monitoring stations in Guangzhou. The scheme was sent, in addition to as a paper copy, also on a computer diskette, so that information could be entered on a computer.

Towards the end of the quarter, a Station Description Summary Table has been made, to be able to make an overview of the large network in GZ, suitable for further analysis of the representativity and coverage of the GZ area. This summary table will be discussed during the workshop in April.

Based upon this, the GZ team was to fill in the scheme with information on all stations in GZ, by 31 March.

There has been no comments or questions received from the GZ side, so it is assumed that the scheme presented no problems, and that the work in GZ proceeded according to plans. By about 1 April, I received a telephone call from GEMC, indicating that the work had been done, asking whether I wanted to receive the results by fax, or whether I would wait until the workshop in GZ. My answer was to wait, but that it would be good to receive by fax some examples of the results from the work. I did not receive a fax, and expect to discuss in the results with the task team in GZ after the workshop. It was indicated that the following work had been done:

- Completion of the Station Description Schemes for all sites
- Preparation of overview of air quality data for 1995, according to the specifications in the detailed work plan.

2. Modifications to the detailed work plan

Before the April workshop, there are not foreseen any modifications to the DWP.

3. Plans for the next 6 months.

The work for the next 6 months will follow the DWP:

- GZ team will prepare the report on network/station description by 30 April, 1997
- GZ team will propose an improvement plan for the monitoring, by 30 June, 1997

NORCE team will evaluate, propose modifications (if any), and a final agreed plan will be reported by 31 December, 1997.

- The first instrument purchase should be done in May, after consideration of offers from various suppliers. The rest of the equipment will be purchased during the year, after the evaluation of the present monitoring system is finished.
- The report on instrument purchase will be prepared by the end of the year, by the GZ and NORCE teams in collaboration.

- Training will take place during the planned exchange stay of Mr. Dong at NILU during the fall of 1997.
- Regular monitoring with delivery of quality controlled data will start during the fall of 1997.
- Status report will be prepared for 1~he workshop 2,1997 (in October), and annual report will be prepared by the end of the year.
- Introduction of the monitoring data into the database of the AIRQUIS system will be part of the Task 3 program.

4. Problems

No substantial problems so far, but the communication from the GZ side (confirmation of received information, contacts about the progress of work), could be improved.

5. Exchange

The GZ side has proposed a training stay of Mr. Dong this year (1997), and this will be a benefit to this task. A prerequisite for this is that Mr. Dong can communicate in English well enough to take part in activities at the NILU Instrument department, and communicate with the people who can provide the training. The program for the training should be discussed in detail during the April workshop.

Task 5. Air pollution exposure assessment

Status report. Guangzhou

1. Work performed by March 31, 1997

As planned, Task 5 will not set out until June, 1997; no work has been done so far.

2. Amendments to the Detailed Work Plan

No amendment has been made.

3. Plans for the coming six months

Plans are as indicated in the Task 5 of 1997.

4. Problems

It is apparently a tough job to obtain data about population in various districts. They are highly confidential. We have to get special permission from certain municipal departments.

Since Task 1, Task 5 as well as Task 6 all need such population data, and Task I will begin their work earlier, so Task 5 is to cooperate with Task I in doing the jobs.

The accomplishment of Task 5 will entirely be based on the model input and calculations of Task 3, thus, I suggest we have the training of applications of

KILDER and ROADAIR models before June 1,1997. This can help us work efficiently in collecting necessary data and waste no time.

5. Exchange

There is no plan for exchange for Task 5 at the present.

5.6 Status report, NORCE (by Atle Riise, NILU)

1. Work performed as pr. 31. March

There is only one sub task which is scheduled for the period from the end of 1996 to March, 311997. This is sub task 9, concerning Assistance and training. Apart from introducing the methods and discussing the topics at the kick-off seminar, no work has yet been done by NILU personnel on this sub task.

2. Modifications to the Detailed Work Plan

NILU has made no modifications to the Detailed Work Plan. However, some changes may be appropriate as is explained under "Problems' below.

3. Plans for the next six months

Plans are as given in the revised Detailed Work Plan.

4. Problems

NILU wish to point out the necessity and possible benefits of co-ordinating task 5 and I regarding the collection of population data distributed on "community areas" (see sub task

1) Task 1 needs these data to distribute various emission data, and is therefore dependent on an early data. Task 5 has planned the collection of these data at a later stage, starting on the 1. June 1997.

We strongly recommend that the time schedule and the distribution of work for this topic is discussed and clarified at this workshop.

5. Exchange

We have made no plans for exchange for this task.

5.7 Task 6-1 Health Damage Assessment

5.7.1 Status report, Guangzhou

1. Work performed by March 31, 1997

According to the detailed work plan (DWP) for 1997, we have begun health statistics data collecting. We have got in touch with Guangzhou Municipal Public Health Bureau (GMPHB), Guangzhou Municipal Public Security Bureau (GMPSB) and some hospitals to find out data sources. Because, at present, we have not obtained approval of the above-mentioned departments, so we still have not gain any detailed data for each end-point.

Now we have got some preliminary information about the following points:

I) Number of deaths
Census Register Section of Ten Department of Guangzhou Municipal Public Security Bureau (GMPSB) owns the register of Death Certificate. The content include name, sex, age, address, birth date and death date, death cause etc. Therefore, if permitted by the GMPSB, we can collect total number of deaths, number of respiratory deaths and cardiac deaths per day in the last years and in 1998.

2) Census register
There are census register data in GMPSB, the detailed information still need surveying. It is estimated that it may be data sources of random selection of our participants in the interview study. But we have not decided how to select until we know the detailed information in the data base exactly.

3) New lung cancer cases
At present, illness classification statistics are collected only in general hospitals. So the number of new lung cancer cases in 93, 94 and 95 collected by Statistics Department of Guangzhou Municipal Public Health Bureau is incomplete. Under these circumstances, the data in 1998 will be the same.

4) Hospital admissions
There are only a part of statistics of hospital admissions obtained by GMPHB. Therefore, the hospital admissions collected from GMPHB are incomplete. However, at present, a great part of hospitals in Guangzhou register hospital admissions. The register card contains name, sex, age, work unit and address, date (in and out), codex for illness classification, etc. Such being the case, it is needed to find the hospital admissions register in all hospitals to collect the respiratory and cardiac hospital admissions in 1993 1994. 1995 and 1998.

5) Out-patient visits and health station visits
In many hospitals out-patient visits register is not accurate because of failure of register. In health station, visits register is the same. The out-patient register regulations were introduced in 1996. The register content includes name, age, address, diagnostic, first visit or subsequent visit etc. But in many hospitals the out-patient visits are not registered completely yet because of lack effective management. So it will be very difficult to collect the accurate number of out-patient visits and health station visits.

2. Modifications to DWP

There is no modification to DWP for Task 6-1 until Dr. Jocelyne’s coming to Guangzhou in June 1997.

3. Plans for the next six months in 1997

The plans for the next six months will be as given in the detailed work plan for 1997.

4. Problems

1) How to collect a great deal of health statistical data and select participants efficiently? Task 6-1 team need to collect health statistical data from Guangzhou Municipal Public Health Bureau, Guangzhou Municipal Public Security Bureau and all hospitals in Guangzhou (see DWP for 1997). Firstly, it is very important for us to obtain permission from the above listed departments and hospitals. So the project technical group and Task 6-1 team of china side should coordinate with the above listed departments effectively. Secondly, we have to solve some problems such as paying for data, man-power, funds and medical ethics etc. We are trying to find a good way to obtain data at present.

2) Lack complete data base
   The preliminary survey show that the existing data base at the Statistics Department of GMPHB is incomplete. For instance, there are no complete statistics of hospital admission and new lung cancer cases per year in the GMPHB. Therefore, data needs to be collected for all cases from all hospitals. The problem is how to collect all data completely, exactly and efficiently? We are not quite sure whether we can obtain support from all hospitals in Guangzhou.

3) Too many participants in the interview study
   a) Insufficient interviewer
      In the original work plan, 6000 participants will be interviewed in 5 geographical areas within 5 weeks. This is mean that at least 60 full-time interviewer will be needed in the interview study. It is very difficult for us to find enough full-time interviewer temporarily. But it may be easier to find some part-time interviewer.

   b) Too long time for interview
      Each questionnaire study in a family will take 1 to 1.5 hours. If there is a child in that family, it will take more than 1.5 hours. The interview time is too long to be accepted by a family generally in Guangzhou, a city with large population.

   c) Public security
      At present, under the situation of public security in Guangzhou, it is not safe enough to let an interviewer go into a strange family. On the contrary, it is also not easy for a family to trust a stranger and accept an interview. Therefore, we plan to inquire some member of residential committee of street in the study area to go along with the interviewer. This becomes another difficult work for us.

      Because of the above listed reason we suggest to cut the participants to 4000 so as to get more accurate sample data of less number instead of more data but with poor accuracy.

4) Insufficient man-power
   There are 3 people in Task 6-1 team now. It is obviously not enough to collect a great number of data from different sources, input data, code

address, and interview study etc. It is important that necessary man-power are made available to our task team. We hope add 4-5 people to help us collect health data, input data, code address etc. and let 50-60 people to take part in our interview study in the interview period temporarily.

5) Funds
It is important that enough funds are given available to purchase a large amount of data from different sources, to pay interviewers for their work in our task etc. We hope Norway side can provide a part of funds to our task to purchase data.

6) Relations with the other groups
Existing monitoring data from the last years will be used to predict the risk level for various end-points. Will the monitoring data be provided by task 4? And will the data be given to task 3 or task 6-1?
   - Whether the map chosen by Task 1 is able to apply to coding address by Task 6-1?
   - What data should be provided by Task 6-1 to Task 9 cost-benefit analysis group is not clear.

7) Technology needed and provided by Norway
   - A great deal of data analysis will be finished by Task 6-1 team, so we hope Norway side provide SPSS or SAS statistical program and guide us to analyze data using the program in the project study.
   - The risk level for various end-points will be predicted in the study. We hope Norway side will teach us how to predict the risk level.

5. Exchange

We have plans for exchange for this task.

5.8 Status report. NORCE (by Jocelyne Clench-Aas. NILU)

1. Work performed 1st quarter 1997

The study is divided into two parts, the one using standard available statistics, and the second acquiring relevant data for Guangzhou. After defining the scope of the study during the Kick-Off Seminar, the NORCE Team has been working on completing the questionnaires for the field epidemiology study.

2. Modifications to the Work Plan

The Work Plan Will have to be modified to reduce the scope of the study, for the main survey while adding a sub-study that will specifically address some of the issues needed in damage assessment. This work will be further discussed during the visit of Jocelyne Clench-Aas during June. However, it is imperative that prior to this visit, the necessary preliminary investigations on availability of data, and resources for the field study are cleared up by the Guangzhou team.

3. Plans for the next 6 months

The next 6 months will be used to finalize the field epidemiological study, to finalize the questionnaires so that they may be translated, and the manuals for the interviewers. In addition, the data collection plan for approach I must be finalized, and as much data collected as possible prior to the arrival of the Chinese scientists to Norway.

4. Problems

The primary problem is defining the scope of both Approach I and 2. This should be finalized in the next 6 months.

5. Exchange

If Li Zhiqin is only allowed one trip to Norway, this trip should be planned during the analysis phase of the study. However, it would be beneficial that she comes twice, once to work on preparing how data should be set up and entered, and later for data analysis. Should, Li Zhiqin come twice, the 1997 trip should be arranged such that Kristin Aunan is back from her pregnancy leave. Therefore we are suggesting that her stay be placed within the period from the middle of September to the end of October. Her training will then be both at CICERO with Kristin Aunan and at NILU with Jocelyne Clench-Aas. The training at NILU will consist in methods of data collection, data entry and data control. The use of standard statistic programs will be investigated. The training at CICERO will involve using the computer programs on the available data brought from China on damage assessment, so that adjustments in data collection can be done if necessary.

5.9 Task 6-2 Damage assessment for materials

Status report, Guangzhou

1. The work done before March,31,1997

1.1 Implement of the field exposure test

1.1.1 Test Racks

Based on the international standards, ten test racks were made. Size:480mm x 280mm x 1050mm.

1.1.2 The Test Points

During the kick-off seminar, we and Norwegian export Ms Henriksen chose 7 test points after field inspection, these points located on the regular air quality monitoring points in city area. Considering the power plants located in suburban area and the reasonableness of point distribution, we added 3 three points, the 10 points are as following: 1# Guangya middle schooL2# Silaisi school,3# GRIEP, 4# GCMS, 5# Haizhu MS, 6# Lu iake,7#. Electric facility institute, 8# Dongshan MS, 9# Huangpu MS, 10# Panru MS. 9# and 10# located in the power plants collection area.

1.1.3 Panels Installation

Time: .Jan 21 -. 30, 1997.
Installation: 3 carbon steel panels and 3 zinc panels for each rack.

1.2. The collection of pollution and climatic data.

1.2.1 Pollution level
results from the Task 4.

1.2.2 Climatic parameter
results from the Task 3.

1.3. Building classification and exposured materials calculation
1.3.1 Classification
According to discussion and analysis between two sides, the buildings of Guangzhou were classified into 10 kinds, as following:

Class A	1 - 5 floors	old buildings
Class B	> 5 floors	old buildings
Class C	5 - 10 floors	new buildings
Class D	> 10 floors	new buildings
Class F	commercial and institutions new buildings	
Class G	industry buildings	
Class H	farmhouse buildings	
Class I	monuments	
Class J	blank	

1.3.2 Materials calculation.
In progress.

2. Modification of the detail work plan for 1997
Temporarily, there is no modification of the plan. The work will be in progress based on the original plan.

3. Arrangement for the next half year in 1997
The work will be in progress based on the detail work plan for 1997.

4. The existing problems
Based on the detail work plan for 1997, the existing problems are listed as following, which will be discussed in the seminar.

4.1 On O_3 monitoring
In task 6-2, the existing dose-response functions will be modified based on the results of field exposure test, for this aim, the monitoring results of 03 is needed. Because, at present, O_3 isn't monitored in Guangzhou, and the exposure test has been carried out, under the situation, it's needed to discuss with other task groups(for example, task 4) how to obtain the O_3 monitoring data.

4.2 Size of grid
Task 3 has decided the size and start point of grid in apr.1997, the minimal size was 1 km x 1 km. according to our detail work plan for 1997, the size of grid needed should be 250m x 250m or 500m x 500m. Therefore, it's also needed to discuss and analysed whether the output of pollutant grid concentration from the task 3 will be up to the requirement of task 6-2.

4.3 Climatic parameter and pollution level data

Pollution level data: the task 4 ought to tell us the date of providing the relevant data. Climatic parameter: the task 3 ought to tell us the date of providing the data of TOW.

5.10 Status report. NORCE (by Jan F. Henriksen. NILU)

1. Work performed by 31 March 1997

The contribution to the kick-off seminar report was finalized in January 1997 with input both from the Norwegian and Guangzhou team.

Mr. F. Gram reported after his visit to Guangzhou that the one year exposure programme of steel and zinc in Guangzhou had been started according to the plan at 10 test sites. A question about the arrangement of the panels on the rack was answered by NILU 3 April 1997.

A good base for the collection of information about building materials was made during the kick-off seminar and reported in the seminar report. So far no information about any delays in the work plan has been reported to Norwegian partner.

2. Plan for the next 6 months

At the kick-off seminar a detailed work plan for the whole project was finalized. There is no indication of any changes in the work plan at this stage.

3. Problems

The budget for the Norwegian part for this year is limited and will only cover consultant work to the work that the Guangzhou group need to do.

The task for the material group need good contact with the emission and modelling group to create the environmental data needed for the cost benefit study in Guangzhou. The group also need correct information about the GRID size and location of origo to carry out the work for collection of materials at risk data for different parts of the city.

If this task is delayed, this will effect the work plan for the material group to some extent.

4. Training

In the project plan there was no indication of training of people from the material group in Norway. This topic has therefore not been discussed at the kick-off seminar.

From the proposed training programme in 1997 I have seen that Mr. Tian Kai is a part of the group proposed. With his background an qualifications I am convinced that a training in Norway will be beneficial for the material work.

A detailed plan for his stay must therefore be worked out. It must include both the period for his visit as well as a plan for his whole study during the period. From

the Norwegian side it seems that late autumn or early next year could be possible periods.

5.10.1 Task 6-3 Vegetation Damage Assessment

Status report, Guangzhou

1. Work before April 1997

According to the DWP 1997 of this task, collecting GZ background information and relative papers were main work for Guangzhou side before April this year.

So far, a lot of units or related departments have been inquired by Guangzhou side. We got some information from the South China Institute of Botany(Academia Sinica), Agriculture Monitoring Station of Guangdong Province, Agriculture Monitoring Station of Guangzhou and so on. Most focus on the relationship between acid rain and vegetation. Vegetation damaged by the acid rain, buffering of acid rain by the vegetation however. The data about the distribution and concentration of acid rain in Guangzhou have been also collected at the same time. On the other side, we have collected some literatures of vegetation damaged from the heavy metal, the pollution-resistant evolution in plants and its genealogical costs. Search of the distribution, standard, and concentration of main air pollutants, including the change trend in the future of Guangzhou have been conducted. Moreover, we have found the critical level of some air pollutants damage on the vegetation. in addition, the analysis methods regarding the effect of main air pollutants on plant physiology have been consulted and understood deeply.

2. Modified DWP

1) Since we need so much investigation and study work, literature summary in the subtask

2.2 will be delayed to July 1998.

2) Precipitation data collection in subtask 6.2 will be delayed to December 1997.
3) The other modification of DWP will be decided until Torjørn Larssen come to Guangzhou in May.

3. Plans for the rest of 1997

1) Going to Beijing and Chongqing etc. for inquiring and collecting information.
2) Preparing the background information of Guangzhou continually and collecting the literature of the effect of photochemistry smoke on vegetation.
3) Finishing the subtask 1.1-1.3 (field survey and registration, selecting plots, sampling plants and performing some of the analyses)
4) Continue choosing the pollutant resistant plants and looking for the information about the effects of heavy metal on the vegetation.
5) Data for the precipitation chemistry and amount, as well as the articles about the effects of acid rain on the vegetation should be collected.
6) Bai Yun mountain forest will be surveyed on Oct. 1997

4. Problems and proposal for solution

The communication between Guangzhou and Norce is working well. Nevertheless, quite a lot of investigating and research works should be done in Guangzhou depending on the DWP. There is only one person in the task besides me till now. It is very important that two or three more people take part in our task in order to complete the task well.

5.11 Status report. NORCE (by Thorjorn Larssen, CICERO)

1. Work by 31 March, 1997:

From the NORCE side the work within this task so far have been mainly literature study. Main focus has been direct effects on rice from gaseous pollutants, especially ozone and SO_2. At the opening seminar it was made clear for the NORCE group that rice is the most important crop in the Guangzhou area. Literature search in different databases have been conducted in Norway and several research papers ordered and read. We now are aware of the international level of knowledge concerning effects from ozone and SO_2 on rice. However, most research are done in Japan on cultivars of rice grown in Japan. To what extent the cultivars used in Guangzhou show the same effects are still uncertain.

2. Plans for the rest of 1997

On the subtask concerning direct effects on crops dose-response functions for rice should be found from the literature. Such equations should then be discussed with experts in Guangzhou, and hopefully we can agree on a equation to use in the yield toss estimates.

Collecting information concerning acid rain effects and heavy metal contamination will be the other focus from the NORCE-side. Data will be available during the summer and autumn from a Chinese-Norwegian cooperation project on acid rain and its effects. Result from that project will be valuable for the estimates of effects from acid rain and heavy metal pollution planned in subtasks 5 and 6.

For all the subtasks vegetation and soil maps should be made available.

3. Problems

In the detailed workplan quite a lot of work is put on the Guangzhou-side. The communication between Guangzhou and NORCE task leaders are working well. However, there is much work to be done in Guangzhou and the Guangzhou team should probably be strengthened; either by involving one or more additional persons in the task, or by giving task leader Su Xing more time for the task and less translation and secretary work.

4. Exchange

The most important subtask concerning the total output of the entire project is the estimation of yield loss. This is input for the Cost-Benefit task, and is planned finished before the end 1998. (However, this is dependent on when ozone-concentration data are available from monitoring and/or modeling.)

In connection with calculating the yield losses it will be valuable to have task leader Su Xing in Oslo, hopefully late 1998.

5.11.1 Task 7. Control options

Status report. Guangzhou

5.11.2 Status report. NORCE (by Fridtiof Unander. IFEI

5.11.3 Task 8. Baseline scenario development

Status report. Guangzhou

1. Work performed by March 31, 1997

1) Initially comment the draft worksheet, constructed by Mr. Haakon Vennemo, which is concerned to create the emission scenarios.(Subtask 1)
   Comments: The data included in the draft worksheet is too intensive , some items are not important for Guangzhou, and didn't coordinate with other groups which is closely related to task 8, So, we should coordinate with other task groups related to task 8 about the data included in the worksheet. And then we adjust the worksheet further.
2) Begin to gather the data related to creating emission scenarios.(subtask 2).

2. Modification to DWP(Detailed Working Plan)

At present, there is no need to modify the DWP. But after this work seminar we should modify the DWP according related tasks' modifications and their requirement for task 8.

3. Plans for the next six months

1) Modify the DWP and the draft worksheet.
2) Gather the data to fill the worksheet.
3) Tentatively construct the energy-needs forecast model.
4) If possible, formulate a tentative emission scenario.

4. Problems

At present, it is still not 100 percent clear what the general task arid other subtasks need from task 8. And we don't know whether what we have done is satisfying the other tasks' requirements for task 8. So we want to have some small workshops to coordinate such issues with other tasks which is closely related to task 8.

5. Exchange

According to the DWP the task leader from Chinese side should take part in the Environment and economy training course it will be held in this spring.

5.11.4 Status report. NORCE (by Haakon Vennemo. ECONI

1. Work performed by March 31, 1997

Mr. Vennemo has made a draft of a worksheet for creating emission scenarios (sub task 1 in DWP). Mr. Fan Changzhong has given his initial comments to the draft, suggesting that it is too data intensive in some aspects.

Mr Fan has begun to search for relevant candidates for emissions sources (subtask 2 in DWP) and to gather data.

2. Modifications to DWP
At present, there is no need to modify the DWP.

3. Plans for the next six months
The goal is to get as close as possible to formulating a tentative emission scenario (that is a scenario where none of the control measures suggested by the project are implemented). Before the next workshop emission sources Should be decided, and we should have ideas and opinions on the change over time of all emission sources and emission coefficients. A tentative emission scenario will be formulated by December, if possible. We need the 1995 emission inventory to complete the emission scenario.

4. Problems
As we see it, it is still not 100 per cent clear what other tasks need from our task, and what the other tasks plan to do themselves when it comes to emission scenario and projections. It appears that task I in particular, but also task 7 plan to do emission projections. What they need is a scenario for the development of emission sources (?) Task 2 need help to make a scenario for industrial coal consumption, i.e., a particular emission source.

In our work we plan to cover both emission sources and emission coefficients, and to formulate emission scenarios. The emission scenarios will probably be simpler than task 1 can formulate, but easy to create and use, and informative for medium and long run policy. Other tasks can make use of the emission scenarios, or they can make use of the emission sources to create their own scenarios.

In addition to gathering data for emission sources and emission coefficients, there is a project to gather data for some other variables, for instance population growth (important for exposure). Task 8 can assist in gathering such data, but need a clear specification of what is needed.

5. Exchange
There are no plans for exchange in this task in 1997.

5.11.5 Task 9. Cost-benefit/cost-effectiveness module

Status report. Guangzhou

1. Work performed by March 31, 1997
Mr. Vennemo has sent over to Mr Yu Jican some copies of articles on the cost benefit methodology and practical examples of cost benefit and cost effectiveness analyses. Mr. Yu Jican has gathered Chinese sources. Mr. Yu Jican has studied the Chinese and foreign material. Mr. Yu Jican has assisted the damage assessment group in collecting data.

2. Modifications to DWP
Mr. Lo Jihei is a new member of this task group. The DWP should be modified to cover his work. He is responsible for cost-benefit analysis/cost effectiveness analysis of materials erosion.

3. Plans for the next six months
Mr. Yu Jican and Lo Jihei will write a survey of Chinese cost benefit analyses and environmental impact assessments with particular reference to Guangdong/Guangzhou examples. An English version of the survey will be sent over to Mr. Vennemo before the next workshop.

4. Problems
There are no particular problems at this point.

5. Exchange
There are no plans for exchange in this task in 1997.

5.11.6 Status report. NORCE (by Haakon Vennemo. ECON)

1. Work performed by March 31, 1997
Mr. Vennemo has sent over to Mr Yu Jican some copies of articles on the cost benefit methodology and practical examples of cost benefit and cost effectiveness analyses. Mr. Yu Jican has gathered Chinese sources. Mr. Yu Jican has studied the Chinese and foreign material. Mr. Yu Jican has assisted the damage assessment group in collecting data.

2. Modifications to DWP
Mr. Lo Jihei is a new member of this task group. The DWP should be modified to cover his work.

3. Plans for the next six months
Mr. Yu Jican and Lo Jihei will write a survey of Chinese cost benefit analyses and environmental impact assessments with particular reference to Guangdong/ Guangzhou examples. An English version of the survey will be sent over to Mr. Vennemo before the next workshop.

4. Problems
There are no particular problems at this point.

5. Exchange
There are no plans for exchange in this task in 1997.

5.11.7 Task 10. Pollution Control Management & Policy Instruments

Status report, Guangzhou. NORCE

1. Work performed by March 31. 1997
According to the Detailed work plan formulated within the kick-off seminar, the research group has finished or is preparing below works before the 1St workshop in April 1997:

- Collected the relevant information about the functions and responsibilities of each unit in the environmental management system from central level/ provincial level to city level. This data include the function in the major departments of NEPA, GDEPB, GZEPB, Liwan District EPB).

- Studied the structure framework of environmental management in China, Interviewed with the staffs in relevant functional agencies and further understood the environmental management structure in Guangzhou.
- Collected the relevant legal and policies documents, and the implementing documents about the environmental management, i.e. Environmental Protection Law, Air Pollution Prevention and Control Law, 8 environmental management systems, etc.
- Finished the first & second draft report of subtask l - " Air pollution Controlling China—an overview of the main principles and the political-administrative framework"
- Preparing the first draft report of subtask 2 "Institution Framework for Pollution Control in Guangzhou"

Finished reports:
The 1St & 2nd draft report of subtask l — "Air pollution Controlling China—an overview of the main principles and the political-administrative framework"

2. Modifications to DWP
The detailed work plan is good enough so tar, no modification is needed.

3. Plans for the next six months
- The report of subtask 1, 2, 3 should be finished before July of 1997.
- The data collection and the drafting of reports of subtask 4, 5 should be finished before the end of 1997.

4. Problems
The problems appeared during the investigation is leak of information sources.

5.11.8 Task 11. Motor vehicle pollution & photochemical smog

Status report, Guangzhou

1. Work performed by March 31. 1997

1.1 To make preparation for the first kickoff seminar and make a plan drafted by China side. During the kickoff seminar, China side first put up the subject of task 11 and made a discussion with Norway side. After many modifications to the draft provided by China side, both sides got a general acknowledge on task 11, and initially decided the participant allocated to it and progress scheme and budget bankroll, etc, and make preparation for next wok status seminar.

1.2 To made a discussion with task 1 on how to collect the data of vehicle emissions in GZ, and formed a general acknowledge on road numbers, vehicle running speed and certifying emission factors, and would allocate one personnel from task 11 to task 1 to do this work cooperated with task 1, and make necessary cooperation with task 2, 3, 4, 6, 7,8,9 and 10, which would give relative work base.

1.3 To make a part material investigation on photochemical smog and how to certify emission factors, so that get a necessary ready for further developing the task.

2. Modifications to DWP

Task 11 workplan hasn't been modified since from the kickoff seminar, but according to late analysis, there found some problems on it as result of its draft background. During the kickoff seminar, China first put up task 11, in fact, this task had plenty of contents to be researched, some had been made rather depth research by China side, in addition, China side had a series of thoughts on how to get vehicle emissions, such as plate test, and so allocated significant personnel and budget resources. Norway side didn't know about the actual problem existing in GZ until come to GZ, then Norway side adjusted workplan and organized relative task group leaded by Mr. Yager to have the research of task 11 with China side and help China form its workplan. But according to present existing condition, both have different acknowledge on some problems, mainly on budget resources, allocating personnel and key research points. Therefore, both would discuss the research depth and width, and make possible modifications on detailed workplan based on actual condition in this work meeting.

3. Plans for the next six months

3.1 To investigate the vehicle emission resources and calculated main pollutions, include existing vehicle amount investigation, vehicle kinds statistics, emission amount calculation of motorcycles and other vehicles.

3.2 To collect and statistics meteorological resource in GZ and its neighbourhood.

3.3 To collect and analyse the resources of GZ city traffic road building and economic social development.

3.4 To monitor and test existing air quality.

3.5 To collect and investigate the resource of vehicle emissions' effect on people health and its pollution forecast.

4. Problems

4.1 Ability:

1) Although presently the allocated personnel to this task were rather strong, in the point of ability there is still great distance to satisfy with its need enough to this complex task. Especially, some more deeply subtasks, such as plate test on vehicle emission factor, photochemical smog, field wind test of style Street on dispersion, would depend on the help from some institutions of Beijing.

2) Norway side also gave rather great support to task 11, and gave some useful suggestion and modification on last draft workplan in the meeting in April, 1997. Follow are the main suggestions on task 11 given by Norway side:
   a. Both Mr. Larssen and Mr. Yager gave a decided reply that task 11 was a very important to the whole project in the meeting on 25, April, 1997.

b. To give strategy of its cooperation with other tasks is Norway side' work focus, main detailed work would be done by China side.
c. The main help submitted to China side by Norway side would be found in each relative task, that is other tasks must submit necessary input data and information to task 11.
But China side still have some other suggestion and requiration.

a. China side would put its foot on the base work and support submitted by Sino-Norway International Cooperation Project.
b. China side hope to get the wholly example about vehicle emissions control in European from Norway side.
c. To get support from UNDP about the information as possible as it can.
d. China would put its mind on cooperation with other relative task groups to finish theirs tasks, and focus on traffic development effect and the research of system control option.
e. China side hope Norway side to participate in writing the final report and submit necessary help.
f. The methods to decide emission factors would be based on the research of GZ INNER-CYCLE ROAD, and do some other tests to verify it, and the road running state test for UNDP would also give supplement to it.

3) Task 1 felt that it was some difficult in collecting vehicle emissions, and task 11 would allocate relative personnel to cooperate with it in order to settle them.
4) Because task 11 has many relationships with many other tasks, task 11 would strengthen its touch with them to raise itself ability.

4.2 Cost:
1) There was great difference between China side and Norway side on allocated budget bankroll.
2) According to present workplan determinated by China side, vehicle emission test would take much cost.

4.3 Training:
China side wish get a chance in training the vehicle emission control technique and relative calculated mode in Norway.

4.4 Exchange Plan
Task 11 has no exchange in 1997, but China side hope to exchange about some subtasks with Norway side in 1998.

5.11.9 Status report. NORCE (by Andy Yager, IFE)

1. Work Performed through 31.03.97
The principal activity during this quarter was to prepare the Kick-off Seminar and Workshop Report. This included finalizing the workplan for this task.

The Norwegian team leader requested feedback regarding progress from Guangzhou in late March; none was forthcoming.

Preparations were begun for the Workshop to be held in Guangzhou during April 2 1-25.

2. Modifications to the Detailed Workplan

There were no significant modifications to the workplan as agreed during the first workshop. The Norwegian task leader will discuss the workplan and possible modifications
with the Chinese side during April 21-22 in Guangzhou.

3. Plans for the next 6 Months

The detailed workplan indicates the activities to be undertaken during the next six months.

4. Problems

The Chinese side has allocated significant personnel and budget resources to this task.
The Norwegian side allocations are relatively small. It will be necessary, during the
workshop, to reallocate Task 11 activity responsibilities to other tasks to ensure adequate
Norwegian counterpart support. In addition, a separate meeting is scheduled during the
trip to discuss the relationship between Task 10 and Task 11.

5. Exchange

There is no exchange training planned for this task during 1997.

5.11.10 Task 12. Pollution forecasting

Status report. Guangzhou

5.11.11 Task12: Pollutant forecasting

1. The work had be finished before 1997.3.31

1> We had investigated the possibility of involving the Guangzhou metro-department as partner in this study . A definite answer that the Guangzhou local metro-office would not take part in this work, and we could purchase the metro-data.
2> The subtask2 was to definite the metro-data which put into Episode model ,it should be finished by Norce. This work was not carried out.
3> We were collecting a partial air quality monitoring data of Guangzhou from 1991-1995, and beginning to analyse this data.

2. The detail work plan in 1997 need not to be modified.

3. The works should be done in the next six-months:

4> To calculate the spatial correlation for SO_2, CO, NO_x, and NO_2/NO_x-ratio from existing monitoring data 1991-1995.
5> Investigate the wind data 1991—1995 to identify common features in the wind pattern and high-level concentration of the 4 compounds. this task should be finished in this year.

4. Problems and demands:

5> The subtask2 was postponed which caused some difficulties to the following works.

6> We hope that NORCE would supply the EPISODE model and it's original program as soon as possible.

7> We hope to get the necessary Metro-data before July 1997.

5.11.12 Task 12 Periodic report of the work in 1997

There are four subtasks in 1997 according to the detailed work plan after the Kicking-off seminar.

Subtask 1: To investigate the possibility of the corporation with Guangzhou meteo-department.
We have finished the work in February and the Guangzhou meteo-department can't take part in the project. We have faxed the result to NORCE through the project office.

Subtask 2: To supply the explanation of the meteorological input data by NORCE.

Subtask 3: To study the monitoring data of SO_2, NO_x, and CO from 1991 - 1995. To definite the location relationship of the substations and the rate of the NO_2 and the NO_x.
We have collected and established the pollution monitoring data base from 1991 - 1995. And we begin to calculate the relationship. This work will be finished by the end of June and supply the report.

Subtask 4: To study the wind field information of 1991 to 1995 year and to definite the typical character of the wind field when the four pollutants are high concentration. It plans to be finished before the end of 1997.

* The task team hasn't other report or information to be suggested.

Task 12
The work plan of 1997 twill not be adjusted

The demand on NORCE:

1. We have started to analyse and statistic the monitoring data from 1991 to 1995. So we demand the NORCE to supply the detailed parameters which are necessary for the calculation and the detailed requirement for the work and supply the formulation of the research result.

2. We have received the same task from Nepa, we are going to develop the research. Then, there are important problems, we are facing is to known if the

Epsode model supplied by Norway are satisfied the demand of Guangzhou reality, so we ask Norway to supply the Epsode model and its original programs and cases which implemented the model in other country and areas as soon as possible.

3. As a task of Nepa, because of the limited time, we have a demand on task 4, we hope they can put the plan of location optimisation and equipments purchase, ahead.

5.11.13 Status report. NORCE (by Dag Tønnesen. NILU)

1. Work performed per 31. March 1997.

Subtask l: Investigate the possibility of involving The Guangzhou Meteorological Office as partners in the study.

The available deliverables possible to obtain from the Guangzhou Met Office was investigated in December 1996. For statistical approaches the Met-Office have data covering a detailed study of wind climate in Guangzhou city. Although the models operated by the Met-Office is on a different scale than required in the Episode model, these models can provide the necessary prognostic data to be supplied to a wind field model for Episode.

Subtask 2: Specification of meteorological in put data.

A meteorological pre-processing unit based on a diagnostic wind field model is under consideration.

To be able to test an appropriate km-scale wind field model for Guangzhou, access to the historical data possessed by Guangzhou Meteorological Office is crucial.

Subtask 3: Establish spatial correlations for SO2, NOR, CO and NO2/NO~-ratio from existing measurement data, with weight on the correlations between stations inside and outside the modelling area.

This subtask shall be carried out by GEMC within 6-97.

Subtasks 4 to 7 are planned for later stages in the project.

2. Modifications to workplan:

There are no modifications yet.

3. Plans for the next 6 months:

Subtask 3 shall be concluded. Subtask 4,dealing with statistical analysis of previous pollution episodes shall start. For this subtask, access to data form the 1991-1995 windstudy in Guangzhou is critical.

6 Minutes from the Workshop discussions
23 April 1997
24 April 1997
25 April 1997

6.1 Periodic report - task 1: emission inventory

Place: Guangzhou Research Institute of Environmental Protection (GRIEP)

Attendants: Huang QingFeng,. Jian JianYang, Kuang JunXia, Pan NanMing, Shun Qun, Yang ShuRou.

Content:

23rd. April

Task 1 made a report about the work progress in the first phase To the leaders of both sides. including the detailed work plan of I 99?. and so on.

23rd. April - 24th . April

Task 1 took part in the following three cooperation meetings which chaired by Mr. Larssen:

1. Discussed with task 2, 5, 6, 7, 8, 1,. each task submitted the data to be collected at the meeting, then confirmed the content and added them up to the point source questionnaire. also the corresponding tasks should assist task 1 with finishing it.

2. Discussed with task 2 and task 11 about how to collect the related data, and decided that the emission coefficients should be provided by task 2 and task 11. But on 8th May. made some adjustment. task 1 together with task 11 should collect the emission coefficients of mobile sources, and task 1 should be responsible for the others.

3. Discussed with Mr. Unander and task 2. 7. 8. about the fuel type and the categories of industry sources in GZ. To meet the need of the whole project. as a preliminary decision. industry trades are categorized according to the static data of the responsible department of environmental protection in GZ. The fuel types are shown in appendix 1, and the trade categories are shown in Appendix 2.

25th . April (afternoon): Summary meeting.

TASK 1
13 May. 1997

6.2 Task 2 & Task 7 Agenda of Workshop

Time: April 22 - 25, 1997

Address:	Meeting-room of GRIEP	
Participants:	Norce----IFE	Mr. Fridtjof F. Unander
		Mr. Andrew Yager
	GZ---GRIEP	Zhong Jieqing, Lin Nisheng,
		Gui Xia, Fan Ghangzhong
	GGNPDC	Li Kangmin, Qin Jia

Discussion Content & Schedule:

April 22 (TUE.)	morning:	GZ team report for report for recent work, introduce detail work plan of 1997
	afternoon:	discuss ways, method and requirement of energy data collection and sort out
April 23 (Wed.)	wholeday:	1-42 Tasks status report
April 24 (Thu.)	morning:	attend meeting of associated task group(T!, T2, T7, T8, TI 1) which is presided by Project Office and Technical Team. GZ introduce existing information and investigation content, scope, grid, etc. To discuss if the data collected by Task 1 could meet the related task's need, and put forward their opinion.
	afternoon:	visit GZ planning commission to find out the situation of energy & economic development and energy supply & demand
April 25 (Fri.)	morning:	Norce demonstrate MARKAL model interfaces, introduce data required by model, discuss how to establish energy balance of 1995 and how to collect those data.
	Afternoon:	summery for the conference

Conclusion:

1. After discussion, in connection with MARKAL model introduced by Mr. Fridtjof F. Unander, the task made clear the technical direction and method of investigation, and information collection. Find out how to establish energy balance sheet and supplement the inventory to be sent out, such as energy consumption - data for Agriculture and Construction.

2. After discussion, Task 1, Task 2, Task 7 and Task 8 made clear their responsibilities respectively. Data base submitted by Task I should meet the needs of related tasks to avoid repetition. Sector clarification was agreed on which data collection base.

3. Task 2 will emphasize coal-fired consumer and power plant to collect and sort out data, on-spot monitoring if necessary. Emission status will be calculated by factors of energy consumption & discharge. Except for power plant, the discharge factors will be studied in a further step.

6.3 Minutes from Workshop 1, 1997; Guangzhou, 23-26 April 1997; Task 6-1 health Damage Assessment

Due to the workshop in April, 1997 of Task 6-1 being postponed till June, 1997, Dr. Jocelyne didn't- come to Guangzhou in April. Therefore, Task 6-1 only had two times of discussions with Task 1 Emission Inventory and Task 9 Cost-Benefit Analysis.

Minutes of Meeting #1

TIME:	24 .4.1997
MEETING PLACE:	GRIEP
PARTICIPANTS:	Steinar Larssen, Andy Yager, Fridtjor Unander, chinese members of Task L2,5,6,7,8
TOPIC:	(only include content concerned with Task 6-1)

1. Map

The map which Task 6-1 need should cover all the study area (8 districts), and process detailed street or road names on it. At the same time, it is required to be the same as used by Task 1 and Task 3. At present, Task 1 and Task 3 have decided two maps which to be used in the project. The larger scope map covers almost all the study area but there are no detailed enough street or road names on it. On the contrary. the smaller scope map has detailed street or road names hut only covers Guangzhou central area. Task 6-1 consider the study scope, start point and grid on the two maps arc fine, but the two maps arc not able to completely satisfy the requirement of coding address by Task 6-1. Therefore. Task 6-1 suggest that Task 1 and 3 choose other maps with detailed street names and all study area retaining the study scope, start point and grid.

Task 6-1 have discussed with Task I concerning the maps,, but Task 1 do not plan to change the maps they have chosen. Such being the case. Task 6-1 have to find the other big maps with detailed street names and with all study scope or find district maps to piece them together. That will bring a great trouble to Task 6-1 in the course of coding address because of different scales on the different maps in two groups. There was no result from this time of discussion about the maps between Task 1 and Task 6-1.

2. Population size data

Since Task 1, Task 5 as well as Task 6-1 all need population size data in each street area, and Task I will begin their work earlier. After discussion. Task I agree to collect the population size in 1995 and provide these data to Task 6-1.

Minutes of Meeting#2

TIME:	26.4.1997
MEETING PLACE:	GRIEP
PARTICIPANTS:	Steinar Larssen, ThorleifHaugland, Klnut Aarhus, chinese members of Task 6-1. 6-2. 6-3 and Task 9.
TOPIC:	(only include content concerned with Task 6-4)

What kind of data should be provided by Task 6-1 to Task 9 cost-benefit analysis was discussed on the meeting. After discussion, it was agreed that Task 6-1 would provide the excess number of deaths or hospital admissions, or cases of lung

disease, etc. caused by pollution exposure. This will he done using dose-response relationships. As to sick leave, this kind of data can be collected only by the interview study because no accurate sick leave records of patients exist in hospitals at present. The output of Task 6-1 health damage assessment will be given in physical units.

Summary

During the meeting period, Task 6-1 has discussed with Task 1 Emission Inventory group and Task 9 Cost-Benefit group separately.

It was clear that Task 1 would - collect population size data in each street area and give the data to Task 6-1. But there was no result from the discussion about maps on the meeting on 24th April.

In addition, it was specified what data should be provided by Task 6-1 to Task 9 on the meeting on 26th April.

6.4 Subtask 8 Baseline Emission Scenario Development

The Summary of the workshop 1, 1997

1. The activity of discussion

Table 1 the activity of workshoup 1,1997

Time		Participants			Discussion contents	Results
		Task group	Experts from Norce	Experts from China		
4.21	11:00am.-5:00pm.	Task 2.7.8	Mr. Yager	related subtasks's leaders	Mr. Yager introduced how to construct the energy balance and provided a energy balance table he had constructed for south Africa.	Tentatively understood how to construct the energy balance
4:22	8:30am.-12:00am.	Task 1. 2. 4. 6. 7. 8. 11	no	related subtasks' leaders	How to coordinate the data collection	related subtasks put forward the the detailed requirements for subtask 1 on data collection
	2:00pm.-5:00pm.	Task 2. 7. 8	Mr. Yager Mr. Unander	related subtasks' leaders	Mr. Unander introduced how to construct the energy-demands forecast model	clarified the coordination between subtask 2 and subtask 8 on construct the energy-demands forecast model.
4.23	8:30am.-6:00am.	All	Mr. Larsen Mr. Yager Mr. Unander Mr. Aahurus	Project leaders and each subtasks' leaders	Status reports meeting	clarified the coordination between subtask 1 and other related subtasks.
4.24	8:30am.-10:30am-	Task 1. 2. 4 7. 8. 11	Mr. Larsen Mr. Unander Mr. Yager	related subtasks' leaders	How to coordinate the relationship between subtask 1and related subtasks	clarified the coordination between subtask 2,7 and 8.
	10:30am.-1:00pm.	Task 8. 2. 1. 7	Mr. Larsen Mr. Unander Mr. Yager	related subtasks' leaders	Mr. Unander explained how to coordinate the relationship between subtask 2,7 and 8	clarified the sectors on data collection.
4.25	10:00am.-11:00am.	Task 2. 7. 8. 1	Mr.Yager Mr. Unander	related subtasks' leaders	integrate the data gathering scope	clarified the scope of data collection.
	11:00am.-12.00am.	Task 2. 7. 8	Mr. Unander	related subtasks' leaders	Mr. Unander run the Markal model	tentatively contacted with the markal model.
	2:00pm.-4:30pm.	Task 2. 7. 8	Mr. Unander Mr. Yager	related subtasks' leaders	Visit the Guangzhou planning comission	collected some data on energy planning for Guangzhou and Guangdong
4.28	10:00am.-12:00am.	Task 8. 10	Mr. Haugland Mr. Aahurus	Mr. Liang Mr. Fan ect.	How to coordinate the relationship between subtask 8 and subtask 10-3	clarified the coordination between subtask 8 and subtask 10-3.

2. The main discussion results

1) The integrated scope of the data collection among task 1, 2 and 7

Table 2 The integrated scope of the data collection between subtask 1, 2 and 7

sectors		coal	coke	biomass	crude oil	heavy oil	fuel oil	diesel oil	gasoline	LPG	city gas	refinery	electricity	others
	Oil refinery													
	City Gas Production													
	Power Generation													
	Agriculture													
	Construction													
Manufacturing	Chemical													
	Metallurgical													
	Paper& Pulp													
	Building materials													
	Rubber													
	Machinery													
	Others													
	Commercial													
Residential	City													
	Village													
Transports	Motorcycles													
	Cars													
	Trucks													
	Buses													
	Rail & Metro													
	Air													
	Water													

2). The coordination between subtask 7 and subtask 8

Mr. Unander introduced:

EMS(t)=Act(t) × EI(t) × EC(t)

EMS(t): air pollutant emission amount

Act(t): Activity generating emissions. e.g. tons of steel.

EI(t): energy intensity, (Fuel consumption /Activity)

EC(t):Emission coefficient, f(fuel , combustion,…, 'EOP')

In my view:

Subtask 8 will be responsible for constructing the baseline scenario development for the energy consumption sectors listed in table 2. The major method is as follows:

EMS(2010)=Act(2010) × EI(1995) × EC(1995)

Assumed the EI(t) and EC(t) will keep on their level in 2010 same as in1995, the baseline scenario development will just concern the influence of ACT(t) for EMS in 2010. The baseline scenario will be provided to subtask 7. Furthermore,concerned the influence of the EI(t) and EC(t) for the EM(t) in 2010, subtask 7 will construct a series of emission scenarios. And then, subtask 7 will make optimum seeking for the emission scenarios through the MARKAL model . Finally, subtask 7 will provide the optimum emission scenario to the modelling group (subtask 3) to make diffuse stimulation forecasting. The results of stimulation (subtask 3) will provide to subtask 5 or other subtasks.

EMS(2010)=ACT(2010) × EI(2010) × EC(2010)

About the work division on data collection, the database on EC(1995) will be provided by subtask 1(Inventory group), the database on EI(1995) will be calculated out through database on the energy consumption in 1995 provided by subtask 2 and the database on ACT(1995) provided by subtask 8. The database on the ACT(2010) will be provided by subtask 8, the EI(2010) and EC(2010) will be provided by subtask 7.

3)The coordination between Subtask 2and subtask 8.

Subtask 8 will help subtask 2 construct the energy-demands forecast model. Subtask 8 will be responsible for collecting the data on the ACT(2010) and ACT(1995) .

4)Subtask 10-3 and subtask 8 will cover three common sets of variables:(Mr. Haugland view)

- **The data on socio-economic variables. This includes developments in population, income, economic activities by sector(industry categories).**
- **Energy consumption and development in transportation (by mode and per ton/km and person/km)**
- **Emission levels and concentration.**

Problems:

The work division between two subtasks on collection the data on the indetification of economic and social developments and corresponding indications of environmental trends(emissions) is not quite clear. And also subtask 8 have no the final list of social-economic variables subtask 10-3 provides up to now.

5) Subtask 5's requirements for subtask 8.

Subtask 5 wants subtask 8 to provide the data on the population growth rate in whole GUANGZHOU city.(Mrs. Li's opinion).

6.5 Minutes from Workshop 1, 1997; Guangzhou, 23-26 April 1997; Task 9 Cost-benefit Analysis

Due to the workshop in April1997 of Task 9 being put off till June 1997 Dr Haakon didn't come to Guangzhou in April. Task 9 only had one time of discuss with Task 6.1. Health Damage Assessment, Task 6.3 vegetation Damage Assessment.

Minutes of Meeting

Time:	26.4.1997
Meeting Place:	GRIEP
Participants:	Steinar Larssen, Thorleif Haugland, Knut Aarhus Chinese member of Task 9,Task 6.1, Task 6.2 and Task 6.3

Topic:

What kind of data should be provided by Task 6.1. Health Damage Assessment Task 6.3 Vegetation Damage Assessment. To Task 9 Cost-benefit Analysis was discussed on the meeting. After meeting. Mr Thorleif wrote a report the contents of report fall into two parts. One part is about further specification of subtask 9.another is modified and preliminary work plan for task 9.1997. the detail can be seen in attachment.

6.6 Task 10 Pollution Control Management and Policy Instruments

6.6.1 Summary of the Workshop

The 1st workshop of "Air Quality Management and Planning System in Guangzhou" in 1997 was held in GRIEP, Guangzhou from April 23-25. According to the agreement from both sides, task 10 arranged a series of activities from April 16 to April 29, includes: interview with relevant units, discussion of the reports of subtask l & 2, and coordinating meeting with other tasks. The content of arrangement shows below:

Date: April 16 1997 Location: City Hall
Participant: GRIEP: Liang Yujie, Liao Yundong
ECON: Knut Aarhus
Energy and Transport Division, Guangzhou Planning Commission: Mr. Xu
Content: Understood the status and developing plan of energy consumption in• Guangzhou. Include civil town gas, electricity, coal, etc.

Date: April 17 1997 Location: GRIEP
Participant: GRIEP: Liang Yujie ECQN: Knut Aarhus
Content: Discussed and explained the structure of Chinese environmental management and legislation system. Improved the draft report of subtask 1.

Date: April 211997 Location: Guangdong Environmental Protection Bureau
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
ECON: Knut Aarhus
Regulation division: Ms. Zhu Miaoyun, Supervision division: Liu Qihan

Content:
l) Understood the procedure of local regulation formulation and implementation.
2) Understood the supervision of pollution control in provincial level, i.e. collection and use of effluent charge, implementation of three simultaneous rule and treating pollution within a prescribed time(TPWPT), also the handling of pollution accident.
3) Understood the limit of authority in provincial EPB.

Date: April 22 Location Liwan District Environmental Protection Bureau (LWEPB)
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
ECON: Knut Aarhus
LWEPB: Mr. Zeng Baoquan, Mr. Yao Yisheng

Content:
1) General introduction of Liwan district and its environmental pollution control measures;

2) Clarified the authorization limit in district level for 3 simultaneous rule, TPWPT, effluent charge, ELA, pollution accident, etc.

Date: April 22 1997 Location: Liwan Environmental Protection Bureau
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
ECON: Knut Aarhus
Development division of GZEPB: Director Wu Qianzhao

Content:
1) Indicated the duties and responsibilities of development division in the pollution control of new project approval in city level.
2) Present the EIA procedure in city level, as well as the status of EIA.

Date: April 23 1997 Location: GRIEP
Participant: All members of AQMS project
Content:
1) Presented the process report from each task.

Date: April 24 1997, morning Location: Guangzhou Petrol Complex (GPC)
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
ECON: Knut Aarhus
GPC: Mr. Qu Tiesheng, Ms. Li Meiying (Environmental and safety Section)
Content:
1) Generally introduced GPC and its environmental pollution control measures;
2) Clarified the function and authorization in an enterprise;

Date: April 24 1997, afternoon Location: GRIEP
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
ECON: Knut Aarhus
GZEPB: Mr. He Zhan
Content:
1) Clarified the authorization limit and functions of 3 simultaneous rule, TPWPT, effluent charge, EIA, pollution accident, in GZEPB.

Date: April 25 1997, morning Location: GRIEP
Participant: task9, 10, 11

Content:
1) Distinguished the responsibilities and coordination between task 9, 10, 11.

Date: April 25 1997, afternoon Location: GRIEP
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
GEMC: Luo Miaorong, Mo Xiuzhen, Lun Weiming, Lu Xiaoan
ECON: Knut Aarhus

Content:
1) Introduced the status of vehicle pollution control in Guangzhou (include. new and old vehicle).

2) Introduced the existing regulations and enforcement for vehicle pollution control in Guangzhou.

Date: April 28 1997 Location: GRIEP
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
ECON: Knut Aaxhus, TorleifHaugland, Hu Tao

Content:
1) Clarified the task division with task 8 and task 9.
2) Formulated the work schedule after the workshop.

Date: April 29 1997, morning Location: GZPCA
Participant: GRIEP: Liang Yujie, Ge Yi~, Liao Yundong
ECON: Knut Aarhus,
GZPCA: Huang Xinmin, Xin Dongping, Jian Jlanyang

Content:
1) Understood the details of effluent charge collection.
2) Understood the function of PCA and the authorization distribution between Guangdong PCA and Guangzhou PCA.

Date: April 29 1997, afternoon
Location: GRIEP
Participant: GRIEP: Liang Yujie, Ge Yi, Liao Yundong
ECON: Knut Aarhus, Torleif Haugland, Hu Tao

Content:
1) Formulated the deadline for the individual report and writing material.

Conclusion
After a deep discussion and widespread investigation during the 1st workshop in 1997, task 10 further clarified the function distribution and authorization limit of the environmental protection agencies from provincial level to district county level. We not only finished two reports about pollution control framework in China and in Guangzhou, but also laid a solid basis for the effective policy making in the future.

6.7 Task 11 Vehicle Emissions Control Option (meeting recorder)

The first working group meeting for Task Ii: Vehicle Emissions Control was held on Friday, 29, Nov, 1996. The Chinese side was represented by Mr. Yu Kaiheng, Mr. Zhu Changjian, and Mr. Wang Boguang. The Norwegian side was represented by Mr. Andy Yager, Mr. Steinar Larssen, and Mr. Dag Tonnesen. At this first orientation meeting, the Chinese side - presented an overview of the vehicle situation in Guangzhou. They offered a tentative workplan to indicate the principal research areas and the "Guangzhou team" approach to dealing with the vehicle emission problem. It was agreed that vehicular emissions are a principal source of air pollution in Guangzhou. However, there was a fundamental

difference between the Chinese and Norwegian workplan in dealing with the vehiclar emissions task. The original NORCE proposal assumed that much of the work related to vehicle emissions would be handled by the other task groups (functional approach). However, the Chinese side proposed that Task II undertake the vehicle emissions activities of the other tasks (sector approach).

A second Task 11 working group meeting was held on Saturday, 30, Nov, 1996, which was attended, on the Chinese side, by members of all the other tasks having input/output relationships to Task II. At this meeting, it was agreed that the Chinese side would produce an draft workplan for Task II which would address the functional exchange for all tasks related to vehicle emissions. This workplan was distributed on 2, Dec., 1996.

The third working group meeting was held on Tuesday, 3, Dec, 1996. At this meeting, the workplan was presented by the Chinese side and was discussed in detail. It was agreed that the Norwegian side should re-assess its approach (and revise as necessary) to ensure appropriate counterpart support to this activity.

According to the plan, a working group meeting was held in GZTEP in April, 1997. The Chinese side was represented by Mr. Yu Kaiheng, Mr. Zhu Changjian, Mr. Wang Boguang and Ms. Sunqun. The Norwegian side was represented by Mr. Andy Yager. Through this meeting, both detained the key tasks of task 11 and the workplan in 1997 more than ever. According to Norwegian conceiving, the vehicle emissions control would put its research content into relative other tasks and task II put its emphasis on strategy research and option decision, additionally, would have research on vehicle emission factor. Other tasks should submit necessary input data and information to task II. Chinese team was agree with Norwegian team basically. But Chinese team hope Norwegian to submit the style example about vehicle emissions control in European and help finish traffic control option device and write final report.

BY TASK II
MAY, 1997

6.8 Task 12: Air Pollution Forecasting

The summary of the first workshop:

Time: 1997.4.22
Place: GIEPS
Personnel: NORCE: MR. LASSON
GUANGZHOU: LIULI, HUGUIPJNG, FANG XENQIN

Discussion content:

1. Reported the detail work plan in 1997, and the finished works before the workshop.
   Guangzhou side had finished the subtask l, and the subtask 3 was in progress.
   NORCE expert said that they would hurry up the subtask 2.
2. Definited that the work plan in 1997 would not be adjusted.
3. Guangzhou side asked that NORCE supply the integrated model (including the original program), and supply the formulation of the research result.

Time: 1997.4.28
Place: GEMC
Personnel: NORCE: MR.LASSON
GUANGZHOU:LIULI, FUCHUN, HUGUIPING, CHENCAN

Discussion content:

1. The situation of the air quality forecasting in Guangzhou.
2. The location of the metro-station ,and monitoring items. We will discuss this questions with Mr. Tønnessen in June.
3. The personnel training plan in 1997.

Summary:

During the first work shop , the task 12 group talked over the detail work plan in 1997 with Norwegian specialist, Reported the result of the finished work, there are no modification to work plan in 1997 . and made clear the purpose of this work in next stage. The main work in the first half of 1997 were smooth , some work are in progress.

Norwegian Institute for Air Research (NILU)
P.O. Box 100, N-2027 Kjeller, Norway

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ABSTRACT

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