

# **Final report**

## **Capacity building in Environmental Protection Bureau in Guizhou Province**

## **Institutional cooperation between Zunyi Environmental Protection Bureau and the Norwegian Pollution Control Authority**

## Abbreviations and acronyms

AM	Annual Meeting
CaC <sub>2</sub>	Calcium carbide
CDM	Clean Development Mechanism
Cl <sub>2</sub>	Chlorine
CNEMC	China National Environmental Monitoring Centre
COD	Chemical oxygen demand
CP	cleaner production
EIA –section	Environmental Impact Assessment –section
EP staff	Environmental Protection staff
EPB	Environmental Protection Bureau
FECO	Foreign Economic Cooperation Office (China)
GEPB	Guizhou Provincial EPB
GZICCEP	Guizhou International Cooperation Centre for Environmental Protection
HCl	Hydrochloric acid
IPPC	Integrated Pollution Prevention and Control
m <sup>3</sup>	Cubic meter
MEP	Ministry of Environmental Protection the People’s Republic of China
MFA	Ministry of Foreign Affairs (Norway)
MOFCOM	Ministry of Commerce the People’s Republic of China
MOFTEC	Ministry of Foreign Trade and Economic Cooperation
NO	Nitrogen monoxide
NO <sub>2</sub>	Nitrogen dioxide
NOK	Norwegian currency kroner
Norad	Norwegian Agency for Development Cooperation
NO <sub>x</sub>	nitrogen oxides
PC	Project Coordinator
PD	project document
PIC	Project Implementation Committee
PM <sub>10</sub>	particles measuring 10µm or less
PVC	Polyvinyl Chloride
RMB	Chinese currency – Yuan Renminbi
SEPA	State Environmental Protection Administration (China)
SFT	Norwegian Pollution Control Authority (“Statens forurensningstilsyn”)
SO <sub>2</sub>	sulphur dioxide
SS	Suspended solids
ToR	Terms of Reference
TSP	total suspended particles
ZEPB	Zunyi Municipal EPB

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# 1. Decision makers summary

The main focus of the institutional cooperation between Zunyi EPB and the Norwegian Pollution Control Authority has been on inspection of heavy industry. The results of the environmental work in an enterprise are seen at the end of pipe, but the end of pipe situation is depending on the quality of the processes that generate or reduce pollution. End of pipe inspections give good answers regarding the pollution situation at that exact moment, but give little information on the situation before and after the visit, and can easily be manipulated by the factory. When moving the inspections into the process-part of the factory, and when focusing on parameters critical for the generation or reduction of pollution, it is easier for the inspectors to identify and verify non-conformities and situations that are sub-optimal.

As a consequence of the project a new method for inspecting polluting industry has been developed. The new methods have been described in a new procedure which includes a number of activities, strategies and priorities. In addition to the inspection procedure, methods and approaches are described in other documents, including a routine describing when inspectors and monitoring staff should operate jointly, and another routine describing a system for identifying the worst non-compliers.

The above has brought about several changes in ZEPB. There is now, *inter alia*, more focus on the process, not only on end-of-pipe; the competence on industrial processes amongst the inspectors has increased; it is more communication with the enterprises during inspections; ZEPB has been equipped with tools to identify the worst non-compliers; more time is spent on the worst non-compliers, less on the compliers; there is more cooperation with monitoring staff in all stages of inspection and ZEPB utilise its monitoring data in a more comprehensive manner.

During the project design it was emphasised that knowledge regarding procedures and skills that are necessary for ZEPB to possess in order to fulfil their role as a local environmental government administration should be improved. A training programme consisting of 11 specially designed courses for ZEPB covering a large range of areas related to environmental management has been conducted.

In order to improve the efficiency and qualitative performance of ZEPB the project has delivered three products aimed at (1) improving the quality checks and management of emission application reports from industry; (2) implementing a new electronic filing system for monitoring, inspection and application reports, and finally (3) installing an automatic data acquisition system for collecting air quality data from the monitoring stations in Zunyi.

New procedures enabling a systematic approach to the data quality assurance of application reports from industry and thus reducing dependency on personal experience are now available in all EPBs in Zunyi.

The filing system is an excellent tool for electronic storage, searching and management of four different types of reports at the ZEPB. It fits well within the needs of the inspection section, EIA section, the new development project section and the Monitoring Station. As such it has improved the efficiency of report usage, even if the current number of reports stored, especially older ones, is limited. The filing system is still under development, but is prioritised under the Exit Strategy and is expected to be operational next year.

The establishment of a fully functional automatic data acquisition system has enabled real time transfer of air quality data from monitoring stations to the central Monitoring Station and ZEPB. This has in many ways improved the efficiency and qualitative performance of ZEPB and the Monitoring Station, especially concerning the staff dealing with monitoring and information management.

Further the project has contributed to increased environmental awareness in the 22 key polluting factories in Zunyi. A series of seminars, mainly for inspectors and key polluters, and a mini-Cleaner

Production (CP) study has been undertaken to secure the above. A total of 6 enterprises took part in the training, and several CP measures are already taken and even more measures are under way.

## 2. Introduction

China's economy has the last decades increased rapidly after opening up to a more market-oriented economy. Environmental concerns has along the economical development slowly but progressively increased its importance. However, pollution is still a major health threat and ecological issue in China and the country has large challenges related to protection of the comprehensive ecological biodiversity. Efforts to control China's pollution problems have thus become a top priority for the Chinese leadership.

In Guizhou Province, being one of the poorest provinces in Western China, the conflict between economical development on one hand and ecological conservation and pollution prevention on the other, is prominent. Guizhou Province is rich in natural resources and coal resources in particular. The industrial enterprises in the province include metallurgy, coal and electric power and chemical industry. The dominant energy carrier for the industry is coal.

Zunyi Municipality is the second largest prefecture in Guizhou Province and is heavily industrialised. It has roughly 3 000 industrial enterprises.

The institutional cooperation programme between Zunyi Environmental Protection Bureau (ZEPB) and the Norwegian Pollution Control Authority (SFT) was initiated subsequent to a visit of the Norwegian Minister of Environment Ms Guro Fjellanger in Guizhou in 1999 as a response to the challenges described above. A delegation headed by the Norwegian Agency for Development Cooperation (Norad) confirmed the intention to develop a cooperation programme in 2001, and the programme itself was elaborated jointly between GEPB, ZEPB and SFT in 2002. The Project Document was based on the recommendations of a Logical Framework Approach workshop held in Zunyi. Key staff from Guizhou EPB and Zunyi EPB attended the workshop, thus the project was based on locally identified needs and priorities.

The President of the Norwegian Parliament Mr Jørgen Kosmo visited Zunyi late 2004 and announced that the cooperation programme would receive Norwegian funding. The programme commenced January 2005 when the contract was signed by Director General Ms Li Daiqiong of Zunyi EPB and Director General Mr Håvard Holm of SFT. The project had a time frame of four years and an economical frame of NOK 7 mill.

## 3. Project description

The overall goal of the project was to reduce the industrial pollution in Zunyi, and the more concrete project purpose was to improve the quantitative and qualitative performance of Zunyi EPB, especially the staff dealing with monitoring, inspection and information management.

The project had four outputs:

### **Output 1: Monitoring and inspection staff will be able to verify compliance with discharge permits.**

Zunyi is amongst the most polluted cities in China. The main problem is air pollution, but the water pollution is also severe. It is the industry that must take the main responsibility for the present situation, and Chinese environmental authorities have been and are taking steps to improve the situation. It is important that the industries comply with the national, provincial and local discharge/emission standards in order to improve the situation. This output aimed to improve/provide the Zunyi environmental authorities with the instruments that are needed to verify whether the industry complies with the discharge permits.

**Output 2: The level of knowledge with EPB staff on appropriate environmental management procedures is substantially raised.**

There is a growing awareness amongst the population and the authorities regarding the importance of maintaining a healthy environment. Unfortunately, there are numerous examples of the environment being the losing part when other economic development activities are implemented. The environmental authorities sometimes do not have the required power and status to compete with the “heavy” traditional municipal sectors. One reason for this situation is the lack of appropriate knowledge with the environmental authorities on well accepted international environmental management strategies and procedures, to be able to defend the case of the environment towards higher decision-makers, and to improve their own management performance in the future. The activities under this output were designed to equip the staff of ZEPB with increased knowledge on environmental management procedures.

**Output 3: Zunyi EPB’s reporting system and reports are substantially improved.**

The ZEPB has a wide spectre of reporting requirements. From the different monitoring and inspection activities data are produced on ambient air quality, water quality, discharge of wastewater and air emissions from enterprises. Most of the data was previously stored in manual files, and data were not easily accessible. The speed, quality and flexibility of a reporting system are very important in order to meet the various requirements, and the reporting system has been improved to meet those. This has been done by a combination of improving the reporting procedures and increasing the capacity of electronic storage and introduction of electronic communication.

**Output 4: Environmental awareness raised in selected key pollution enterprises.**

It is realised that in order to reach the long-term goal of reduced industrial pollution in Zunyi Municipality, it is not sufficient to build capacity in EPB. In order to facilitate an improved dialogue and cooperation between the two main actors, being EPB and the polluting industry, it is imperative to also raise the knowledge and awareness regarding environmental matters with the industrial decision-makers and the environmental workers in the industry. The need for such awareness raising activities materialises as a natural extension of the awareness raising amongst the EPB staff itself. In order for the improved EPB monitoring and inspection systems to improve, the wholeheartedly support and cooperation from the industry is needed, especially when some industries also will be subject to testing of revised procedures and systems. Several awareness raising seminar targeted towards the industry has been held, together with a simplified version of a Cleaner Production Programme.

A series of activities have been undertaken in order to meet the objectives. These included workshops to discuss challenges and solutions, common elaboration of procedures and standard formats, on-the-job training, study trips, seminars, Cleaner Production programme etc. The ZEPB staff’s capability to speak and write English was limited at the start of the programme and thus an English course has been offered for those that has participated in the programme in order to ease the language barrier. The activities are further described in chapter 4.

## **4. Implementation in relation to plans (efficiency)**

The following chapter describes to what degree the outputs and the activities have been undertaken in relation to the plan put forward in the project document. In designing a project it is difficult to foresee all potential problems that might occur, likewise it is difficult to have a total grasp of all aspects that might affect project implementation. Thus some deviation from plan should be expected, and these deviations are explained in chapter 4.5. All activities are also documented in the travel reports, see annexes.

## **4.1 Efficiency related to the output “Monitoring and inspection staff will be able to verify compliance with discharge permits”**

Below the efficiency with regard to output 1 is described.

### **4.1.1 Summary of output 1**

Output 1 addressed the need to increase the monitoring and inspection staff’s ability to verify compliance with discharge permits. The main activities included arrangement and conduction of seminars and workshops on inspection principles and enforcement systems, to review the existing system within Zunyi EPB, and to discuss areas of improvement. Experts from SFT have been in Zunyi twice a year to accompany ZEPB on inspections at three selected pilot companies to test and develop a new inspection approach and new procedures for inspection. As planned in the project document a group from ZEPB and GEPB visited Norway in 2006 to study SFT’s system for industrial inspections.

The output focussed initially on explaining and demonstrating different techniques and approaches, including the European Union regulation on the topic, e.g. the regulations on inspection work and on IPPC. This was done both in presentations, discussions and on-site at factories.

The results of the environmental work in an enterprise are seen at the end of pipe, but the end of pipe situation is depending on the quality of the processes that generate or reduce pollution. End of pipe inspections give good answers regarding the pollution situation at that exact moment, but give little information on the situation before and after the visit, and can easily be manipulated by the factory. When moving the inspections into the process-part of the factory, and when focusing on parameters critical for the generation or reduction of pollution, it is easier for the inspectors to identify and verify non-conformities and situations that are sub-optimal.

Some inspection equipments have been purchased: pH-meters, two devices for real-time-testing of gas -emissions, and uniforms and protective gear for the inspectors in order to increase their personal safety, visibility and authority.

The SFT team realised that detailed laws and regulations with regard to the inspection system in China already existed, and that these seriously reduced and restricted the possibilities for new approaches. These restrictions were not identified in the pre-study or the project document. There is for example a detailed state regulation in China on inspection frequency, which should be followed. The Chinese partners have however been very open-minded and creative to find possibilities for changes and modifications within the existing framework.

### **4.1.2 Summary of activities undertaken in relation to output 1**

- 24 joint inspections with examples, discussion, demonstrations etc
- 3 seminars on inspections, techniques, discharge treatment facilities, monitoring principles, enforcement, international trends etc
- 1 study tour to Norway in 2006
- Reviewed inspection systems
- Training seminars where the industry give lectures on industrial processes
- Preparation of new procedures for inspections (annexes)
- Preparation of routines for prioritisation of enterprises (annexes)
- Preparation of routines for exchange of information between inspectors (annexes)
- Reviewed communication between inspectors and monitoring staff, suggested improvements
- Preparation of routines for cooperation between inspectors and monitoring staff (annexes)
- Identified and purchased on-site monitoring equipment
- Identified the need for and purchased personal protection gear and clothing

## ***4.2 Efficiency related to the output “The level of knowledge with EPB staff on appropriate environmental management procedures is substantially raised”***

Below the efficiency with regard to output 2 is described.

### **4.2.1 Summary of output 2**

In September 2006 a team consisting of two Norwegian experts and one Chinese expert reviewed the existing environmental management knowledge in Zunyi EPB. The focus was on procedures and skills that are necessary for ZEPB to possess in order to fulfil their role as a local environmental government administration. A training programme was elaborated in cooperation with the management level in ZEPB. The program included 15 courses. 11 of the courses (including Industrial Processes which covered 9 sub-issues) were completed as scheduled, while 4 were postponed to December 2008.

In addition to the courses included in the Competence Plan, Weekly courses in basic and advanced English were arranged during the whole project period in order to ease the language barrier and a study trip to Norway for 5 management level staff from ZEPB and GEPB was arranged in 2007. The delegation was introduced to Norwegian policies, strategies and priorities and was also shown practical examples of environmental management “in the field”.

Key data as regards the courses are given in annexes.

### **4.2.2 Summary of activities undertaken in relation to output 2**

- One workshop for developing the training program
- 11 courses on technical and general environmental issues
- Courses in basic and advanced English have been arranged throughout the whole project period
- A study trip to Norway was arranged in 2007

## ***4.3 Efficiency related to the output “Zunyi EPB’s reporting system and reports are substantially improved”***

Below the efficiency with regard to output 3 is described.

### **4.3.1 Summary of output 3**

The deliverables from this output was associated with an overall improvement of the different reporting systems in ZEPB (e.g. legislation, documents and report transfer system, monitoring reporting system, public complaints etc.) Later it was decided to narrow the focus of the output (see 4.5). Accordingly the deliverables were developed into three products aimed at:

- improving the quality checks and management of emission application reports from industry,
- implementing a new electronic filing system for monitoring, inspection and application reports, and finally
- installing an automatic data acquisition system for collecting air quality data from the monitoring stations in Zunyi.

The outcome of this output is based on one study trip to Norway and four workshops held in Zunyi in the period 2005-2007.

The motive for developing procedures for quality checks and management of emission application reports from industry was harmonizing and streamlining the quality checks and management of the

application reports. The procedures has been translated into Chinese and distributed to all county and district EPBs within the Zunyi municipality. The procedures were effective as of 1st January 2008.

The electronic filing system for monitoring, inspection and application reports, plus EIAs, was developed for the ZEPB during 2007-2008. The filing system should have been available on the local intranet, giving both ZEPB and the local EPBs easily access to the different types of reports. As of September 2008 the system (due to software conflicts and technicalities regarding installation) is only installed locally in four PCs stationed in two sections of the ZEPB (inspection section and general office), the Monitoring Station and one district EPB.

During July/August 2008 an automatic data acquisition system for collecting air quality data was installed at four automatic monitoring stations, incl. software to handle and process the data on an internal web page at the Monitoring Station of ZEPB. Data is acquisitioned every 15 minutes for the components SO<sub>2</sub>, PM<sub>10</sub> and NO<sub>x</sub> (NO and NO<sub>2</sub>), and provides the ZEPB with continuous online information of air quality. With the system it is possible to detect and document abnormal air quality situations within 15 minutes. The system is developed and produced by a Chinese company.

The ZEPB is planning to procure two more data-loggers which will be installed in the remaining two automatic monitoring stations in the City of Zunyi. Key features of the system which will be utilised in the future are e.g. better processing of historic data and incorporation of similar systems with in-stack online monitoring in the industry, monitoring of acid rain and noise.

#### **4.3.2 Summary of activities undertaken in relation to output 3**

- After two workshops (March 2006 and November 2007), a set of procedures for quality checks and management of emission application reports from industry has been developed, and is distributed to all county and district EPBs.
- The procedures for quality assurance of application reports from industry were distributed to all county and district EPBs in Zunyi in November 2007.
- An electronic filing system for reports has been installed in four PCs.
- An automatic data acquisition system for collecting air quality data from monitoring stations is installed at four automatic monitoring stations.
- Study trip to Norway in August 2005 with an emphasis on reporting of data from industry.
- One workshop in March 2005 produced a list containing a detailed description of the reporting systems in ZEPB. This list was later developed into a list of possible improvements and prioritisation of the different items after a workshop in October 2005.

#### ***4.4 Efficiency related to the output “Environmental awareness raised in selected key pollution enterprises”***

Below the efficiency with regard to output 4 is described.

##### **4.4.1 Summary of output 4**

Output 4 has focused on raising environmental awareness in the bigger enterprises in Zunyi. It has consisted of two parts: A series of seminars, mainly for inspectors and key polluters, and a mini-Cleaner Production (CP) study.

A total of three seminars have been arranged, and all the 22 key polluting industries have been invited. The seminars have been well received by the industry. Thematically they have covered many areas, from challenges concerning long range transboundary transport of pollutants like mercury and acid rain to CP. There have been presentations from both Chinese and Norwegian speakers. Two of the seminars were held back-to-back to the visit of the Norwegian Minister of Development Cooperation

and the Minister of Environment.

The Cleaner Production component was delayed more than half a year, as it was difficult for ZEPB to find a qualified consultant to do the training and analysis. However, when the consultant was identified, the consultant team worked fast, and issued the final report at the end of April 2008. The consultant was Professor Li Guangming of the Tongji University, Shanghai.

A total of 6 enterprises took part in the training. ZEPB has been responsible for the execution of the CP component; SFT has had a role as dialogue partner. The CP study was meant to focus on “the low hanging fruits”, which is no-cost/low-cost solutions, and was primarily meant to be a demonstration project.

The first activity, the base-line study and basic training took place in August 07, the training was finalised in a visit in September 07. During October-November 07 the enterprises did their internal analysis, ending with a new visit and discussions in November. These discussions, concerning priorities, importance, relation to environmental problems etc was of special interest to the ZEPB, and they participated fully on this stage. The final report was submitted at the deadline, 30. April 08.

The comparison study with evaluation of results after the project findings were implemented has been delayed. According to the consultant such study is not included in the contract. It is also difficult to quantify the effects of the numerous activities that have taken place, and several of the activities need more time for implementation. The ZEPB have planned a comparison study in October 2008.

SFT took part in choosing candidates from the industry, and also in choosing consultant. ZEPB did the contracting with the consultant and took part in the base-line study without support from SFT. SFT have met with the consultants twice during the project to discuss the status and progress, and once after the project was finished.

The final report from the consultant was more focused on costly, technologically advanced actions than anticipated. Even so, it also contained several low cost/no-cost suggestions for most of the factories.

#### **4.4.2 Summary of activities undertaken in relation to output 4**

- Three seminars for industry have been arranged
- Baseline study CP has been undertaken and reported
- Training sessions CP has been conducted by the consultant
- Final CP report has been approved and issued
- Training of EPB staff

#### **4.5 Explanation of major deviations from the plan**

Two activities planned in the project document were already taken out during the appraisal undertaken by Norad and the Norwegian Embassy. This is not a deviation from plan, but should nevertheless be mentioned.

- “Appropriate computer hard- and software is purchased, installed and in satisfactory operation within 2005”.
- “10 key staff in ZEPB trained in using a computer and relevant software by the end of 2005”.

With regard to the rest of the project document, the main deviation came in relation to output 3. Output 3's main focus was aimed at improving the reporting systems and quality of reports at the ZEPB. In Mars 2005 a list of required reports within ZEPB and to outside target groups was prepared. However, after a workshop in October 2005, the scope was altered. The reporting systems in China are complicated and there was a risk of losing focus if the project was to cover all sorts of reports. It was

therefore decided to allocate the resources into improving the key reports from industry.

At a workshop in Mars 2006 it was decided to develop procedures for quality assurance of the application reports (used for calculating emission fees) from industry. In addition to the procedures it was decided to establish a filing system for reports and an automatic data acquisition system for collecting air quality data from monitoring stations. One of the driving forces for establishing an electronic filing system was to make monitoring reports available to inspectors and inspection reports available for monitoring staff.

Apart from the deviations explained for output 3 above, all other activities have been carried out in accordance with the Project plan and the annual activity plans.

## 5. Use of funds

A summary of the use of funds compared to budget is shown in the table below. As can be seen from the budget, there is a little surplus after the project has been completed. The major deviations from the original 2002 budget are explained below the table.

### BUDGET SUMMARY (OUTPUTS) (final 14.11.08)

	Budget	Consumption	Balance
Preparation activities	308 222	280 655	27 567
<b>Output 1</b> - Monitoring and inspection staff will be able to verify compliance with discharge permits	2 950 950	3 019 919	-68 969
<b>Output 2</b> - The level of knowledge with EPB staff on appropriate environmental management procedures is substantially raised	1 126 100	1 193 084	-66 984
<b>Output 3</b> - Zunyi EPB's reporting system and reports are substantially improved	874 324	910 455	-36 131
<b>Output 4</b> - Environmental awareness raised in selected key polluting enterprises	689 162	453 602	235 560
Management	443 840	644 592	-200 752
Miscellaneous	48 000	47 276	724
Bang Fu	200 000	226 522	-26 522
Exit strategy	0	172 865	-172 865
<i>Sub total</i>	6 640 598	6 948 969	-308 371
<i>Budget</i>	6 640 598		
<i>Contingencies</i>	359 402		
<i>Consumption</i>	6 948 969		
<i>Balance</i>		51 031	

There are three posts on the budget that deviate considerable from the original budget – output 4, the budget line for management and the Exit Strategy.

With regard to output 4 the expenditure has been lower than expected. The reason is that it was expected that SFT should take a more active part in the Cleaner Production programme. This activity was however delayed, and when the CP consultant finally was identified it was not possible for SFT to take part in the baseline study as planned. This meant that time and travel expenses for SFT personnel were lower than budget.

The budget line for management was grossly underestimated when the budget was elaborated in 2002. The fact that the programme was planned in 2002, and that the budget was tied to the 2002 hourly rate for Norwegian Governmental Agencies (determined annually by Norad), has resulted in that less time has been available to the activities than originally planned. The hourly rate for SFT advisers was NOK 540 in 2002, while it was NOK 670 in 2008. The project management has therefore to the extent possible tried to combine activities to keep the costs down. However, this has proved difficult with regard to project management. Both ZEPB and SFT have thus used a lot more man-hours than was budgeted for and this has been covered by the respective institutions. It was nevertheless necessary to cover some activities that were not planned for over the budget. This relates for example to extended stay for the project management in conjunction with the visit of the two Norwegian Ministers to Zunyi in 2006 and the final workshop in 2008. Further the costs related to the annual auditing of the Chinese budget were not included in the original management budget, even though it was stated in the Agreement between MFA and MOFCOM that these expenses should be covered by the Grant. These expenses have been put under the budget line for project management.

It should also be noted that every time the top management level from SFT has visited Zunyi, the expenses on the Norwegian side has been covered by SFT while the expenses on the Chinese side (transport, banquets etc.) has been covered by ZEPB. SFT also invited a high level delegation from GEPB and ZEPB to Norway. SFT covered all expenses incurred in Norway for the delegation, while the Chinese delegation covered their own travel expenses.

The mid-term review identified a need for an Exit Strategy. Both GEPB, ZEPB and SFT fully supports the need for such a strategy. This was not planned for, but the project management proposed to use some of the remaining funds to support the strategy. However, the bulk of the funding needed to implement the Exit Strategy will still have to be covered by ZEPB.

## **6. Results**

### **6.1 Goal achievement**

Below the effectiveness of the programme, i.e. the extent to which the purpose has been achieved is attempted described. In particular the concrete changes the project has brought to ZEPB is emphasised.

#### **6.1.1 Goal achievement in relation to “monitoring and inspection staff will be able to verify compliance with discharge permits” (output 1)**

Based on the seminars, workshops and joint inspections the project has developed a new method for inspecting polluting industry.

The new methods have been described in a new procedure which describes a sum of activities, strategies and priorities. All of these are not applied in every inspection. This is mainly due to the high and increased frequency of inspections, up to several times in a week. However, the inspectors seem to have a clear view on which inspection techniques to use on which inspection activity.

In addition to the inspection procedure, methods and approaches are described in other documents, including a routine describing when inspectors and monitoring staff should operate jointly, and another routine describing a system for identifying the worst non-compliers.

Thorough interviews with staff from ZEPB, city EPBs and local EPBs as well as three different enterprises confirm that the main changes in the procedure are well implemented and are disseminated

and increasingly used also outside the project. Both local EPBs and enterprises outside the project confirm that the new methods are being used.

The Norwegian project team has also been informed that ZEPB have developed, approved and started a program for spreading the new methodology outside the project. The training is based on on-the-job-training and train-the-trainers principles, where selected staff from the pioneer city EPB's are sent out to work together with selected inspectors at local EPB's.

*The result of the above is that it is easier for ZEPB to document non-compliances, and that it is easier for the enterprises to understand and learn from the inspections. ZEPB's own assessment of the new approach is shown in table 1 below.*

Number	Inspection items	The old inspection methods	The new inspection methods
1	The preparation of inspection	Lack of preparation	Full preparation
2	The roles of inspectors	Unclear	Clear
3	The goals and task	Clear	Clear
4	The inspection procedure	Random	Standardize
5	The investigation and note-taking	Not comprehensive	Comprehensive
6	The inspection report	Don't have	Have
7	The treatment	Fine	Warning and fine
8	The efficiency	Have	Better
9	The requirement of inspectors	Not high	High
10	Working time	Short	Long
11	The discussion	Not comprehensive	Comprehensive

### **Summary of the achievements**

- More focus on the process, not only on end-of-pipe
- Competence development on industrial processes amongst the inspectors
- Higher visibility during inspections due to uniforms and protective gear with logo
- More communication with the enterprise during inspections
- More involvement of the general management of the enterprises
- Reporting directly to the enterprise's management
- More detailed inspection reports
- Tools to identify the worst non-compliers
- More time spent on the worst non-compliers, less on the compliers
- More cooperation with monitoring staff in all stages of inspection
- More use of monitoring data
- Use of portable monitoring equipment for easy on-site spot checks

### **6.1.2 Goal achievement in relation to “the level of knowledge with EPB staff on appropriate environmental management procedures is substantially raised” (output 2)**

The identified competence gaps covered specific technical and more general environmental issues, *inter alia*, industrial processes, emergency response, hazardous waste, awareness raising, CDM and pollution quotas, end of pipe treatment etc. See annexes for detailed list.

All presentations given by the Norwegian side are made available for ZEPB for future use.

The courses were generally attended by 6-30 participants (c.f. annexes). The course on Awareness Raising was attended by 93 persons in total – of which 60 came from the industrial enterprises (most of these were from the management level). The courses on Industrial Production processes were

arranged back-to-back during a period of 7 days with participants from both ZEPB and local EPBs. Most of the participant (35 in total) attended all or most of the sub-courses. The course on Hazardous Waste was attended by 37 persons from Pollution Control Sections in District- and County EPBs.

The course on Environmental legislation and relevant policies was organized by Zunyi EPB and attended by 40 persons from both municipal, district and county EPBs.

*The most important effects of the training courses, according to ZEPB, are improved management and better technical knowledge, especially as regards industrial processes, in the EPBs.* The courses on Industrial Processes and End of Pipe Treatment were considered as particularly useful, since this improves communication with industry and enables Inspectors to identify process related problems more easily.

### **Summary of the achievements**

- Increased technical knowledge and on-site inspections abilities by EPB staff.
- Better knowledge of industrial processes and thereof improved quality assurance of reported data in the EPBs.
- The training has made the inspectors more conscious as regards the information given by the industry, and better understanding of the usefulness of quality assurance and independent measurement of emissions.
- The English skills of 30-40 persons in EPBs have been substantially improved. This has been confirmed by the Norwegian team.

### **6.1.3 Goal achievement in relation to “Zunyi EPB’s reporting system and reports are substantially improved” (output 3)**

Through workshops, study trips and procurement of software and hardware the ZEPB (incl. the Monitoring Station and local EPBs) has increased its capacity to manage and monitor pollution through improved quality of reporting from industry, implementation of a filing system for reports and enabling real time transfer of air quality data from monitoring stations.

Previously there were no procedures for data quality assurance of application reports from industry in Guizhou Province. In this respect the new procedure pave the way for a new approach to the management of application reports. Even the filing system is regarded as pioneering, at least in a local context, through the combination of different reports in the same system.

The new procedures for quality assurance of the data reported from industry have been distributed to all district and county EPBs. However, as revealed by a team from SFT and the Monitoring Station, the level of implementation differs between the EPBs. In some EPBs there seems to be a lack of understanding of the purpose of the procedures. The methodology in the procedures are not always utilised as intended, e.g. the use of cross-checking, partly due to insufficient input data necessary for carrying out additional quality checks. One reason for this could be the lack of training in the use of the procedures. It is thus recommended to initiate training and information to the potential users of the procedures and also to set up a system for systematic feedback from users to improve the content and relevance of the procedures. This has been included in the Exit Strategy. *Despite of the deficiencies, the procedures has contributed to increased quality of the reports and emission data from industry. They also constitute a tool for new staff to learn how to ensure good quality of data reporting.*

The filing system is an excellent tool for electronic storage, searching and management of four different types of reports at the ZEPB. It fits well within the needs of the inspection section, EIA section, the new development project section and the Monitoring Station. As such it has improved the efficiency of report usage, even if the current number of reports stored, especially older ones, is limited. A major constraint to the usage of the filing system is its limited implementation. In addition there is still some debugging to be done with the software. Responsibilities (section and persons)

regarding the management of the filing system have not yet been decided on. This has contributed to delays, and e.g. made it difficult to implement the filing system on the intranet which is in the plan for the filing system. *Due to those shortcomings the filing system has at present had limited contributions to improvements in the quantitative and qualitative performance of the ZEPB. However, the system is expected to be fully implemented in the near future when the deficiencies have been improved by the ZEPB as described in the Exit Strategy.*

The establishment of a fully functional automatic data acquisition system has enabled real time transfer of air quality data from monitoring stations to the central Monitoring Station and ZEPB. This has in many ways *improved the efficiency and qualitative performance of ZEPB and the Monitoring Station, especially concerning the staff dealing with monitoring and information management.* Less time is needed for collection of data from different measurement stations, the operation of instruments at the stations can be remotely controlled and provides the staff at the central Monitoring Station and ZEPB with tools for immediate detection of air pollution incidents. Automatic data acquisition systems for air quality are a requirement issued by CNEMC (China National Environmental Monitoring Centre) in August 2008. Zunyi is ahead of most cities in this respect due to the project.

### Summary of the achievements

- New procedures enabling a systematic approach to the data quality assurance of application reports from industry, thus reducing dependency on personal experience, are available in all EPBs in Zunyi.
- Increased quality of the reports and emission data from industry.
- The new filing system has to some degree improved the efficiency of report usage and storage.
- The filing system has to some degree increased the integrated usage of monitoring data and inspection reports.
- Allowing real time transfer of air quality data from monitoring stations to the central Monitoring Station and ZEPB through an automatic data acquisition system has improved both the efficiency and the qualitative performance.
- The automatic data acquisition system provides the staff at the central Monitoring Station and ZEPB with tools for immediate detection of air pollution incidents.
- The operation of instruments at monitoring stations system can be remotely controlled.

### 6.1.4 Goal achievement in relation to “environmental awareness raised in selected key pollution enterprises” (output 4)

Several activities in the project aims at creating awareness of environmental issues at the enterprises, the seminars are among these activities. Together with the new inspection approach, the new inspection reports and the uniforms, the awareness raising seminars have contributed to a visibly higher awareness at the factories. This is, *inter alia*, seen in a significantly higher staffing of their EP units.

The CP component created a multitude of activities and suggestions; these are referred to in an annex of this report. There have been concrete suggestions for

#### *Case study 1; CP results*

At the Zunyi Cigarette Works they had purchased a new and better machine to recycle tobacco from cigarettes that are broken during the production process. The old machine could not produce good enough quality on the recycled tobacco. This resulted in high volume of tobacco waste in the factory. During SFT's visit, the machine was undergoing trial production. When the machine is in full production it should enhance the quality of the recycled tobacco, making the factory able to increase the recovery rate of tobacco and reduce the need for raw materials as well as the amount of waste.

The factory has also modified their wet desulphurization device to remove dust and SO<sub>2</sub> from the exhaust gas of the two 10-ton boilers in the plant's main production area. After the modification, the device reduces the emission of SO<sub>2</sub> to 20 kg/h and smoke dust to 3,2 kg/h.

The Maotai Brewery has made several modifications to reduce the water usage in the production by recycling water. The most important of these modifications is maybe the reuse of waste water from the alkaline washing of the bottles in the desulphurization facility for the boilers. This is enhancing the effect of the device and at the same time reducing the need for lime, thus saving the environment from SO<sub>2</sub>. The efficiency of the desulphurisation is improved after the modifications. In addition the measure reduces discharge of waste water, and thus reduces the factory's costs of water.

Both industries showed great interest in continuing the CP-work after the end of the project.

improvements at all six enterprises. The CP training also led to further development of ideas at the enterprises as well as at the ZEPB. Inspectors from all 14 EPBs has e.g. visited the Maotai Brewery, the Zunyi Cigarette Works and the Zunyi Alkali Company and studied the activities and solutions there. The ZEPB will as a result of the project have inspectors in all 14 EPBs with special training in CP issues. This obviously helps create a new tool for the inspectors, as a majority of the improvements seen at the enterprises starts as exchanges of ideas between the enterprises and the inspectors.

An extra benefit of the project is that the CP study was part of the background for the construction of the new electroplating facility after the relocation of the Long March Electroplating, together with the EIA. Several of the CP suggestions are under implementation at the new site.

At the project review, SFT visited two factories; The Zunyi Cigarette Works and Moutai Beer Co. Ltd. Both factories demonstrated that they were familiar with the CP concept, they had arranged studies at their factories, and also implemented CP measures as a result of the studies, c.f. case study 1.

### **Summary of the achievements**

- The enterprises and the EPB staff have taken part in the training, studied the possibilities and come up with suggestions
- CP report with detailed proposals is produced
- CP-measures are implemented in the enterprises
- Inspectors from all EPBs have visited and studied CP activities at three enterprises
- The EPB inspectors reports that environmental awareness has improved at enterprises management
- The enterprises have continued their improvement work after the CP component was finished

## **6.2 Impacts**

Taken into account that this has been a four year institutional cooperation programme, and that the changes that have taken place in ZEPB has been introduced gradually during the cooperation period, it is still early to expect considerable changes in the environment. However, it is possible to measure effects on the industry that has been used as pilots in the programme, and these changes have also been described as case studies. Further to the extent possible, more general emission data and monitoring data are described. It is however, not possible to dedicate positive or negative changes to this project alone, as also other factors might influence the environmental conditions in Zunyi.

Zunyi has, together with the rest of the Chinese society, been subject to fast economic development during the project period. Most industries have had an increased production, and improved economy has also implications on other sources of pollution like traffic and heating and increased their contribution to the air and water pollution. In the booklet *“Friendship Shift the Future”* (annexes), some key factors of pollution emissions in Zunyi during the project is listed. The substances that are most commonly regulated by the Chinese Environmental Authorities are e.g. dust, SO<sub>2</sub>, HCl and Cl<sub>2</sub> to air and COD and SS to water.

The project has seen this development close up, as the production at the Ti factory has almost doubled during the project period, and the boiler capacity at the PVC factory has more than doubled. At the same time the number of days of good air quality, defined by the national air quality standards, in Zunyi City has increased from 261 in 2003 to 305 in 2007. However there are parts of the city that still has more or less constant polluted air due to industry emissions. Monitoring data also supports that the air quality has not deteriorated to the degree one would expect from the economic development. The ZEPB have i.a. data for mean annual concentration of SO<sub>2</sub> and PM<sub>10</sub> showing that there are not a clear trend towards higher levels during the last five years, although the SO<sub>2</sub> values have increased slightly the last two years. The ambient level of both components is virtually the same in 2007 as in 2003, c.f. figure 1 and 2.

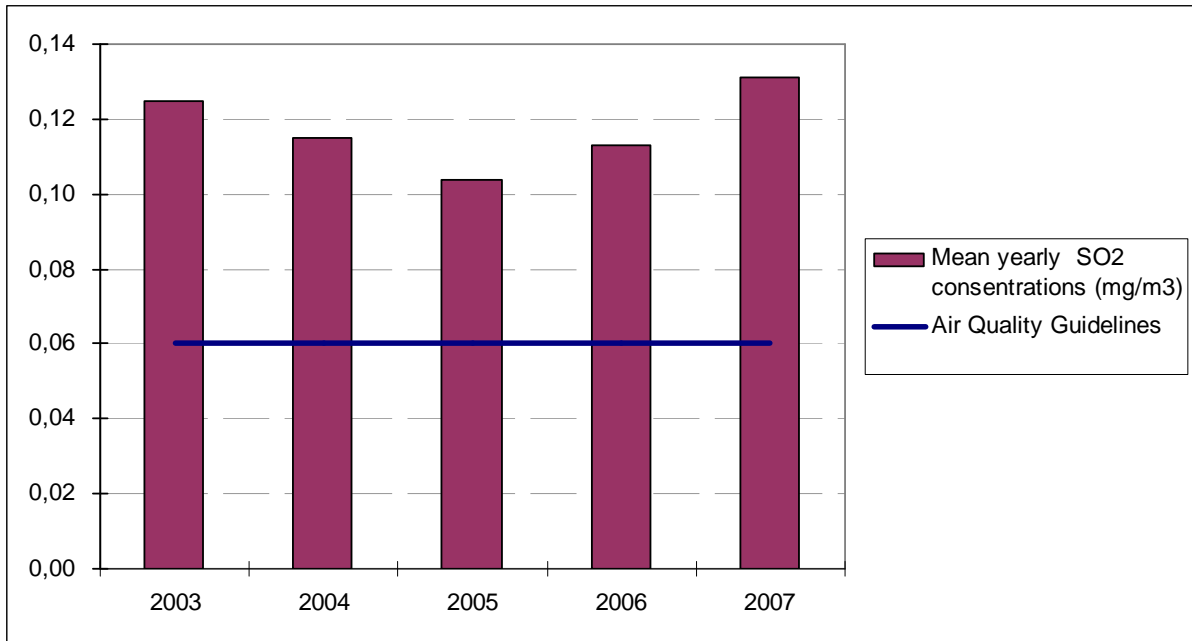


Figure 1: Annual mean concentration of sulphur dioxide (SO<sub>2</sub>) in milligrams/m<sup>3</sup> in Zunyi in the period 2003-2007. (Source: The Monitoring Station at ZEPB)

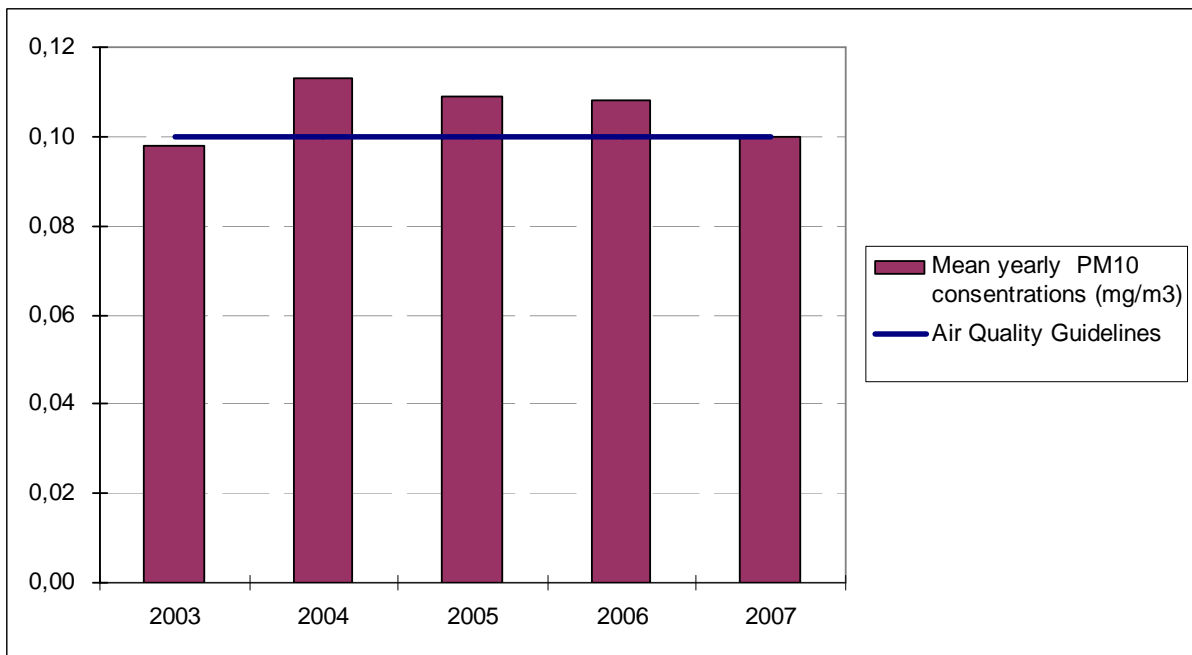


Figure 2: Annual mean concentration of particulate matter (PM<sub>10</sub>) in milligrams/m<sup>3</sup> in Zunyi in the period 2003-2007. (Source: The Monitoring Station at ZEPB)

The above taken into account it is not possible to draw any firm conclusions on whether the project has improved the air quality in Zunyi, and thus reduced negative health-related effects in the population caused by air pollution. On the other hand, any firm conclusions at this early stage could hardly be expected.

Other data seem to indicate that SO<sub>2</sub>-emissions, as well as discharges of dust from coal and COD to water have decreased. These data are indirect and disputable, and there is no clear connection to the project, except for SO<sub>2</sub>-emissions from the PVC factory and HCl, Cl<sub>2</sub> and COD emissions from the Ti factory.

The increased focus from ZEPB-inspectors has directly or indirectly led to increased focus on environmental issues by the management and EP-staff in the enterprises that are subject to the increased inspection activities. This has led to revision of the environmental management system which in turn has clarified the responsibilities within the factory, securing the internal control and follow-up of production problems. By doing this the industry have managed to reduce the number of operational errors that may cause pollution. There are numerous examples in the project on how more optimal running of technical facilities and closer monitoring has lead to lower emissions in the pilot factories.

**Case study 2; Zunyi Alkali Company (PVC-plant)**

- By December 25<sup>th</sup> 2007 the construction works for flue gas desulphurization of the two new thermoelectric boilers with was finalized. This should remove more than 90% of the SO<sub>2</sub> from the flue gas. It is stated that the investment in the desulphurisation facility is mainly due to the project.
- The factory has installed a recovery unit for acetylene and vinyl chloride, hence reducing emissions of the gases and the use of CaC<sub>2</sub> in the production.
- To reduce COD emissions in wastewater there has been focus on enhancing the effect of the treatment facility of waste water.
- The chlorine treatment plant for accidental releases is improved, reducing the risk of pollution due to chlorine leakages.
- A cofferdam for the hydrochloric acid tank is constructed; hence the risk of pollution due to leakages is reduced.
- Start-up of incineration of H<sub>2</sub>S from the water treatment installation which can be utilized as energy. I addition this reduces smell nuisance for neighbours. Awareness of this problem was raised through the project.
- The factory has installed on-line monitoring with link to the EPB for water discharges (COD, pH).

A number of changes have been implemented in the three pilot factories in order to reduce the emissions to air and water. Examples are given in case studies 2-4.

**Case study 3; Zunyi Titanium Co. Ltd.**

- Due to raised awareness the general running of the furnace has improved, with less emission of dust as result. The project has contributed to this result.
- General improvements on different parts of the production and waste water facilities at the company have reduced emission of pollutants and the number of complaints from the neighbours.
- The company finished improving the acidic waste water treatment plant to reach acid waste water treatment capacity to 500 m<sup>3</sup> / h and to meet the first national waste water emission level by the end of 2007. The new improvements were approved by the GEPB in April 2008. The project has contributed by speeding up the improvement process.
- The 108 chloride furnace exhaust gas purification system has been modified and rebuilt by an outside firm and is now under commissioning. This should further reduce the HCL emissions and stabilize pH in water going to treatment plant. The project has contributed significantly in the development of this project.
- The factory has installed on-line monitoring with link to the EPB for discharges to air (HCl) and water (COD, pH).
- In 2007 the magnesium electrolysis – chloride environmental transformation project was completed. The improvements consist of increasing the HCl concentration in the fumes so that they can be reused in the process rather than being discharged. This should enable the factory to reduce HCl emissions by app. 190 tons/year.
- Due to increased environmental awareness, raised through activities in this project, the factory will sign an agreement with an American company on implementing of new low emission process technology.
- Compared to 2005, emissions pr ton product at the Ti factory are reduced with 25% (Cl<sub>2</sub>) and approx. 40% (SS), and this is before the HCl/Cl<sub>2</sub> treatment facility is in full operation.

In total, these measures have so far enabled the factory to keep the emissions relatively stable during the period, even though the production has doubled from 7397 tons in 2005 to 13 454 tons in 2007.

The project has arranged seminars with invited guests from the management of the pilot industries. This has contributed to give the management increased focus on environmental issues in the factory. As a result of this, and the increased inspection visibility and inspection rate, the companies have increased the environmental protection (EP)-staff to keep up with the governments requirements. This has led to closer cooperation between the inspection staff of the EPB and the EP staff of the industries.

The result of this is closer focus on emissions at the enterprises and enhancement of the EPBs knowledge on the industry, which makes them capable of following up the industry in a more comprehensive way.

The project has been recognized by other EPB offices outside the City, and the inspectors within the project has already performed co-inspections with outside EPBs and thereby making the inspection strategy known to EPBs outside the city.

The changed inspection methods have also been utilized on other industries with good results. There are numerous examples on the way the new inspection practice has helped the EPBs in their work. For example The Pan Gau China Pottery Factory is preliminary closed down as a result of a co – inspection between Honghuagang District EPB and ZEPB. Unless they can prove that they are able to fulfill required improvements within a deadline, they will be permanently closed.

#### **Case study 4; The Long March Electroplating Plant.**

The main problem of this site has been the disposal of sludge containing heavy metals from the water treatment plant, leaky pipes and an old production set-up leading to a high production of highly polluted waste water.

The factory has moved about five kilometers from the city center. Before the factory was moved, the inspection activities led to first covering and eventually to removal of the rather large and old landfill of heavy metal hydroxide sludge on the old industrial site. The knowledge from the project was useful when the EIA of the new industrial site was evaluated by the EPB.

Likewise the Zunyi Phosphate Fertilizer Factory has been permanently closed down because of emission of Fluorine (F) into the Nanjiao Water Reservoir. By including the production technique, production process, production volume as well as the environmental facilities into the inspection, the ZEPB was able to document the emissions to the Guiyang EPB, who made the final decision to close down the factory. The closing of the factory has eliminated pollution of fluorine in the reservoir.

With regard to the CP demonstration project, all the participating enterprises are working on implementing some of the suggestions from the CP analysis. Most of these requires time and planning to be implemented. On the two enterprises that were visited during SFT's visit in September 2008, at least three activities had effects that could be quantified:

- The efficiency rate of the desulphurisation is better than 95 % after the modifications in both the Maotai Brewery and the Zunyi Cigarette works, which reduces the SO<sub>2</sub> emissions by more than 50% compared to before the modifications.
- Saving approximately 1000 m<sup>3</sup> high quality water a day in addition to the saved costs of lime at the Brewery.

## **7. Lessons learned**

### **Sufficient time to for the institutions to be acquainted with each other is necessary**

Both China and Norway are in many ways well regulated and developed countries with long cultural and administrative traditions. Still, there are differences in background and approach, and it is naturally challenging to change well established systems and methods.

The project plan has taken this into account, and reserved some time for learning each other and to establish necessary mutual understanding and confidence. The pre study was also quite comprehensive and good. Even so, the need for time to understand each other and exchange necessary information in the first phase of the project was underestimated, especially for the outputs with few visits the first year.

### **Good translation services is needed**

The language barrier has been apparent throughout the project, even though the locally hired interpreters have made a lot of efforts. The project has also had invaluable help of an English speaking staff from ZEPB.

During the first three years the project had three different local interpreters, none of which held professional standards. They were all English teachers at local schools. Although they learned fast and were very helpful, they were not professional interpreters, and lacked skills in administrative and technological English, as well as basic understanding in some of the roles of an interpreter. Several times during the discussions the communication had to change to a direct exchange of the notation used in chemistry, physics and engineering between EPB staff and SFT, as it was very difficult to communicate these issues in English through the interpreters.

Good and frequent communication has been necessary to gain common understanding of the work that should be done. The language barrier has affected this work, e.g. checking out issues on e-mail has been difficult.

### **Continuity, competency and commitment of staff is important**

The stability, competence and commitment of staff on the Chinese side has been very important, and allowed the Norwegian team to act more like facilitators. Thus, the methods and solution chosen for the project goal has been based on Chinese priorities, administrative traditions and background. The local focus has been necessary to develop the solutions that work in practice. This way of working is time consuming, but the results are obviously more sustainable.

It is also necessary to allocate sufficient personnel on each side. Some of the personnel on the Chinese side would have preferred to have more colleagues to discuss problem to be addressed in their own language. Thus minimum two persons from both project partners must be responsible for each output in the project.

On the personnel side it has been relatively stable on the Norwegian side, with the exemption of two experts that left SFT during the project period. This has been important taken into account that there are considerable differences in the Chinese and Norwegian systems as described above.

### **Management buy in is important**

From the very beginning the management of ZEPB and the affected EPBs were interested and had focus on the project. They managed to select very well qualified personnel for the different roles in the project. This commitment from the management has been valuable for the project.

Further it has proved useful to include several layers of the management in the project. The project has focused on starting the training and development of inspection approaches on the middle level management, where they are hands-on with the inspection techniques, and also communicate easily with the higher management. This has been of big importance for the project.

### **The project document should have been updated after the appraisal**

The project was planned in 2002, but did not start before January 2005. A team from Norad and the Norwegian Embassy undertook an appraisal in 2004, where after the project was approved. In the appraisal report several changes to the project was suggested but the budget and the Project Document was not updated accordingly. This has led to budgetary problems as described in chapter 5 of this report. For future projects, the Project Document definitively need to be amended after the appraisal and before the approval, in close a dialogue between the project partners and the Embassy in order to secure full buy in from all parties.

### **Need to establish an exit strategy when planning the project**

The mid-term review proposed that the project partner should establish an Exit Strategy before the project ended. This should in the future be done already in the planning phase of the project.

## **8. Sustainability**

Taken into account that most of the procedures and routines established during the four year institutional cooperation already are implemented in ZEPB, there is no reason to expect differently in

the future. Hence the cooperation programme is sustainable *per se*, taken into account that the purpose of the project was to improve the quantitative and qualitative performance of Zunyi EPB, especially the staff dealing with monitoring, inspection and information management. On the other hand it was planned that the cooperation programme also should be a national pilot programme, and that the findings of the project should be spread to a wider part of China. As per date, this is not the case. This was also one of the major findings of the mid-term review undertaken by Norad and the Embassy. Lately MEP/FECO have taken a strong interest in making the more successful Sino-Norwegian cooperation programmes sustainable. This has resulted in proposal for a Sino-Norwegian Competence Building Project on Environmental Management where, *inter alia*, the results from the Zunyi project will be disseminated. Consequently the cooperation programme between ZEPB and SFT might have an impact at national level in the future.

In order to keep the results sustainable it is necessary to acknowledge that as China develops the challenges for the EPBs will change. Several documents are produced during the project, in the form of procedures, guidelines etc. It is important that these are kept dynamic and revised systematically based on developments and knowledge gathered. This is especially important for the following documents:

- procedure for inspections
- procedure for quality assurance of emission data
- routine for identifying the worst non-compliers

For the latter it is also important that the lists of the factories are revised on a regular basis, as the intention is to put sufficient pressure on the enterprise to make it comply.

Another response to the mid-term review undertaken by Norad and the Embassy is the Exit Strategy. This strategy will secure the wider dissemination of results to all the 14 county EPBs in Zunyi, and also to the rest of the province. In addition to including information of the project results in all internal seminars and workshops in the next years and to apply the train-the-trainers principle for their own organisation, ZEPB plans to conduct three thematic training programmes in October 2008. One of these training programmes will focus on the filing system and the QA procedure, the other will focus on Cleaner Production and the last on training of inspectors. A total of 220 persons from Zunyi and the surrounding municipalities will be invited to the training. More information on the Exit Strategy can be found in the annexes.

With regard to the CP programme several changes in the participating companies have already taken place, and can thus be considered sustainable as they are unlikely to return to a less efficient production. Taken into account that all the 14 county EPBs have designated dedicated CP officers that have a special responsibility to promote Cleaner Production, a wider dissemination of CP can be expected.

Throughout the project ZEPB has cooperated closely with their BangFu EPB in Dalian. Reports from that cooperation can be found in the annexes.

# **Annexes**

## **Annual reports**

- Annual report 2005
- Annual report 2006
- Annual report 2007
- Annual report 2008

## **Bang Fu visit reports**

## **Budget/Activity plans**

## **Compendium – documentation of the project, ZEPB**

## **CP reports**

- CP Baseline report
- CP Final report

## **Exit strategy**

- Exit strategy document
- Summary of implementation of exit strategy

## **Matrix training output 2**

## **Procedures/routines**

- Inspection
- Prioritizing worst non-complier
- QA emission data
- Coordination inspection - monitoring

## **Project agreement**

## **Project documents**

## **Study trip reports**

- Study trip to Norway 2005
- Study trip to Norway 2006
- Study trip to Norway 2007

## **Travel reports**

- Travel report number 1-14

If all the annexes should have been attached to the report it would have been very voluminous. The participating institutions have thus decided that all the annexes should be made available at the internet, so that interested reader can download the annexes themselves. The annexes are made available at: <http://www.sft.no/internasjonalt/zunvi>