The Newsletter of the China-Canada Cooperation Project in
CLEANER PRODUCTION

Pulp and Paper Demonstration Project: Full Steam Ahead

For the past two and a half years, a team of experts from a team of experts from the Canadian Executing Agency, a consortium consisting of PricewaterhouseCoopers, SNC-Lavalin and Essa Technologies, and the Chinese Executing Agency has been working with management and engineers at Anhui Paper Mill to identify CP options. This has been a long, laborious effort, but it is now bearing spectacular fruit.

Mark Osterman

This tank recycles water from two paper machines. The equipment costs 310,000 RMB and reduces COD emissions by 90%, TSS by 94%, and recovers 390,000 RMB worth of fibre per year.

A quick recap

When the project started in 1996, Anhui Paper Mill was chosen as a demonstration site, for several compelling reasons, including its profitability.

The team then began to complete the CP audit and identify CP options. This was painstaking work because not all plans and drawings were up to date. The audit involved detective work: find all sources of emissions, map them on a sewer network, then measure them to determine what was going on "up-stream" of the final discharge point. From this work the audit team produced a report identifying many dozens of potential CP options for all process areas and workshops.

In parallel, a World Bank-funded project at the mill also was moving forward. Then suddenly the Asian currency crisis, cancellation of the World Bank project, changes in the paper market, and other reasons beyond the control of the mill, gave rise to questions about the very existence of the mill.

CP to the rescue

Fortunately, the CP auditors were prepared. The auditors presented management with a convincing case to quickly implement a wide spectrum of CP solutions. From the long list of CP options identified, 72 low and no-cost options were implemented.

Implementation of these solutions had a huge impact on the economic performance of Anhui Paper Mill. Following implementation, the CP audit team returned to the mill to audit the results. 28 solutions were audited, representing all production processes at the mill. Financial benefits from just eleven of these solutions, coupled with the financial benefits derived from using cleaner coal, show total net savings of over seven million RMB (local currency units) per year!

The environmental savings from these solutions are also important. COD and TSS emissions are significantly reduced. Even larger improvements are achieved through reduced water consumption and energy conservation. By implementing simple recycling of process water, the mill is able to recover fibres and reduce the resources used in heating and water treatment. Energy conservation is also achieved by insulating process tanks and lines — less coal is burned.

Success breeds success

The prospects of Anhui Paper Mill are completely transformed. All key indicators are improving: COD, TSS, water use, raw materials, coal consumption, acid rain, greenhouse gases emissions and smog all reduced; more paper made, and more money in the bottom line.

Having clearly demonstrated that CP can be profitable, management of Anhui Paper Mill is now enthusiastic about proceeding to the next stage of CP implementation, which are the medium and high-cost solutions. The potential economic benefits are especially compelling at a time when the State Owned Enterprises are increasingly expected to be environmentally and economically viable.

Mark Osterman

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Inside

Summer/Autumn 1999

Implementing Cleaner Production... a Chinese Perspective

In June 1997, a joint Canadian and Chinese expert team selected the Fuyang Chemical Plant as one of the demonstration sites to implement the Cleaner Production (CP) Project. Since then, the plant management has actively participated in the project, and worked with the Canadian and Chinese experts. In the fields of production management, raw material and energy savings, and environmental protection, there has been remarkable progress at the plant, Through it, I personally have gained a great deal of valuable information and knowledge of CP.

1. Introduction of CP concept and understanding its contents

The CP concept was not clear to us prior to the inauguration of this project, even though CP had been used directly and indirectly in the production process. Through two CP workshops we came to understand that the principle of CP is for the improvement of production processes, energy and material savings, and elimination or reduction of pollution. Canadian experts analysed our current approach, how resources are used in China, and the present pollution situation. As a result of the workshops, we realised that we had over-emphasised the end-of-pipe treatment in the past, and overlooked the concept of whole process control. It is the spirit of CP to combine pollution control with production process. After workshops, a clear picture of CP and its concept has been deeply rooted in the minds of people at all levels.

2. Realising the potential of the enterprise through audits

As a result of the enormous effort of both Chinese and Canadian participants, audits was conducted throughout the plant, including the production units, pollution discharging areas, and the production expansion and development plans. Despite the heat and unpleasant environment, the auditors-in-training collected their own samples from very greasy wastewater sewage and the more than ten-foot tall tower roof. Through calibration, monitoring, and analysis—carrying out each step by themselves—they found that the plant was discharging more than 3,000 tonnes of ammonia per year into the atmosphere and wastewater

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What About Gender Equity?

Are women fully involved and productive in Project activities? Do they benefit as much as men from the Project? These are questions CIDA asks under its Gender Equality Policy, which requires that women participate fully and benefit equally from the Project.

China has a much higher percentage of women as engineers than Canada, but generally women are concentrated in certain types of jobs, such as laboratory technicians, packaging, and office staff, with low representation at higher management levels. The Project has identified a need for attitudinal change about women's capacities and for more opportunities allowing women to develop and apply their skills and talents.

A Gender Equity Consultant based in Beijing is working with Project counterparts to raise awareness about gender issues and to promote gender equity. She has led workshops at the factories to discuss gender issues and reasons for the small numbers of women at management levels. She organised an unprecedented national workshop on Gender Equity and Development in Beijing on January 15, 1999. This event was the first time many participants had discussed their experiences with gender issues and considered together possibilities for action. They created a new non-governmental organisation, the Women and Environment Network, to publicise gender and environment issues. They plan to extend this network to the provincial and factory levels.

Under CIDA's policy on gender equity, women should benefit as much as men in all areas of the project: from the pollution reduction and efficiencies introduced through the project, as well as from its training opportunities. The Project is meeting its target of 30% participation of women in all training programs. The Project's gender equity activities have also revealed women's great interest in and enthusiasm for environmental initiatives. The Project seeks to support and catalyze this interest to work towards improved environmental management.

Dorothy Lele, Gender Equity Consultant

Dorothy Lele

Technician in the Quality Testing Laboratory, Anhui Paper Mill. Many laboratory employees in China are women.

For more information on Gender Equity, please contact Dorothy Lele, email 5dl4@qsilver.queensu.ca

Project Update

The China Canada Cooperation Project in Cleaner Production is moving ahead vigorously, fulfilling its stated objectives, consolidating its successes, and using the momentum created by those successes to add new initiatives.

In the policy domain, a case study of the Canadian experience was completed (see Environmental Policy—Lessons Learned article below). The focus then shifted from providing the Chinese with Canadian and international experience, to documenting CP experience in China. A group of Chinese experts has prepared case studies for the industry sector, and a Canadian wrote case studies based on the experience in the Project's demonstration projects. These are available from the Project team or on the Project Web site. Finally, a group of Chinese experts are continuing their study of fiscal policies—specifically tax provisions for energy saving and raw materials conservation investments.

Implementation of Cleaner Production has moved ahead with Development Plans for priority sectors. The guidelines/audit manual is completed for the pulp and paper sector, and a draft manual has been prepared for the fertiliser sector. Implementation of CP solutions is in place, with procurement for medium and high cost solutions almost completed. At the Anhui Paper Mill the medium and high cost solutions have been identified and a timetable for implementation established (see Pulp and Paper Demonstration Project in this newsletter).

Training and awareness activities continue to support policy and implementation activities. Between October 1, 1998 and March 31, 1999, 71 people participated in a series of three Process Improvement Workshops, while another twenty participated in study tours to Canada. A video has just been completed for the Project by the well-known Chinese environmental NGO, Global Village of Beijing (GVB). This will be available as an awareness-raising tool, showing how Cleaner Production has been implemented at the demonstration projects.

The Gender Equity component of the Project was launched with a very successful workshop in Beijing in January. This spawned a new NGO, the Women and Environment Network (see article on Gender Equity).

The Project Web site has been enhanced, providing access to Project information on Cleaner Production and links to a wealth of information on many relevant Web sites. Check it out!

CIDA has approved the expansion of the Project as part of China's plan to demonstrate CP in ten designated cities. A policy case study will be prepared for the city of Taiyuan. A polyvinyl chloride (PVC) factory will be selected in one of Tianju, Dagu, Quzhou, or Xinxiang for an audit in the fall of 1999. This work will form the basis of a CP guideline for the PVC sector, a first for China.

Mary Ellen MacCallum

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China-Canada Cooperation Project in Cleaner Production web site:
www.chinacp.com

Environmental Policies - Lessons Learned

The following "lessons learned" are based on the experience of Canadian governments in the Pulp and Paper Sector. They are cited in a case study prepared for the project.

- Policy frameworks are more likely to work if they are kept simple.
- Seize opportunities resulting from modernisation and industrial expansion to encourage "cleaner production."
- Take advantage of environmental impact assessment as a vehicle to ensure that new and expanded investment incorporate energy efficient, less wasteful technologies ("cleaner production").
- Train designers and people who do environmental impact assessments, or undertake environmental approval processes, in the advantages of "cleaner production."
- Regulatory frameworks should not dictate technologies. They should set loading limits and leave it to industry to come up with the most efficient process or treatment alternatives.
- Encourage quality assurance and environmental management systems. Companies that practice these approaches almost always choose "cleaner production" technologies.
- Use tools developed by others as appropriate. The globalisation of industry promotes a level playing field and many international businesses will either work toward World Bank guidelines or industry best practices often exceeding in performance domestic environmental requirements.
- It is important to monitor experience to identify any barriers or disincentives to "cleaner production."
- Over the longer term successful firms are usually the ones that produce quality products, competitively, by being efficient in their use of energy and raw materials; they are less polluting and more profitable.
- CP makes good business sense, and is embraced voluntarily because it makes good economic sense. CP is not something that is done solely for the environment.

From *Environmental Policy Evolution In Canada …How it has Supported Cleaner Production*, a paper based on the Pulp and Paper sector.

Peter Higgins

For more information on CP Policy, please contact Peter Higgins at HIG Environmental Consultants, 613 592-3074, email higenvcons@aol.com

In memory of Mme. Liang Boqing

Mme. Liang, an environmental specialist in the chemical industry, formerly deputy chief engineer of the Beijing Research Institute of Chemical Industry (BRICI), died of illness on May 5, 1999 in Beijing.

She was born in Shangdon province on October 10, 1941 and graduated from the Dalian Engineering University in 1964 with a degree in Chemical Engineering. Since then, Mme. Liang has worked in many fields in the capacity of technical expert. She joined the Beijing Research Institute of Chemical Industry in 1976, where she has worked on many projects, published technical papers, and promoted international information exchange.

Mme. Liang was chosen to act as the Project officer for the China-Canada Cooperation Program on Cleaner Production, and had the responsibility of managing the Chinese Project Office. Due in no small measure to her efforts and coordination skills, the project has been implemented with great success. She was well respected for her devotion to her work and her pleasant personality. In her gentle manner, she transmitted her enthusiasm for her work to her younger colleagues. Although she is gone, Mme. Liang will be remembered by all those who have had the pleasure and honour of knowing her.

Robert Lao, Canadian Project Manager

A Chinese Perspective on CP

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stream. Added to the loss of material and lubricating oil/grease, the economic result is overwhelming. These losses do not bring any economic benefit to the plant, and yet they increase environmental pollution. All this fugitive ammonia can be recovered through CP planning. This is the most fruitful potential result.

Implementation of CP projects

In accordance with the CP audit report, the plant has modified, over time, the evaluation guidelines for process indicators and facilities, strengthened evaluation capability, and carried out the no/low cost CP project as suggested by the Canadian experts. At the beginning of 1999, our raw material consumption was reduced from 1,500 Kg per tonne of ammonia produced in 1996 to 1,300 Kg/t; oil consumption was reduced from 4.11 Kg/t to 2.17 Kg/t. In all, production cost has been reduced by10%.

Grant support from Canada for the high-cost CP solutions was recently received. The construction of a dilute ammonia concentration unit is underway, and the sulphur recovery unit is being tested. In August, these processes should be in full operation; the discharge and emission of ammonia should be reduced by more than 2,000 tonnes/year, and 500 tonnes of sulphur should be recovered. In addition to the environmental effect, the economic benefit to the plant is substantial.

When we had an opportunity to visit Canada last year, we admired its natural beauty and the clean environment. Hopefully through the Cooperation Project in CP and the support from Canada, one day we too can enjoy blue sky and clean water in China.

Sun Yongcheng, Director
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