



Incorporating Pollution Prevention in the Privatization Process

In the fall of 1994, an EP3 team conducted pollution prevention assessments at a large chemical and fertilizer plant and a textile manufacturer in Zambia. Both facilities are large, state-owned enterprises that are scheduled for privatization soon. The assessments were conducted to determine the value of considering pollution prevention options as well as other environmental factors as part of the privatization process. The assessments looked at both existing pollution problems resulting from the past operating practices, as well as continuing problems. Both assessments demonstrated the importance of considering environmental factors during privatization and highlighted the special role that pollution prevention can play because of its focus on increasing efficiency and reducing production costs.

At the chemical plant, the team iden-

tified significant opportunities for savings by recovering coal (one of the principal raw materials in producing fertilizer) lost in the production process as well as CO₂. A ten-to-one return on investment was estimated for the

"A ten-to-one return on investment was estimated for the CO₂ recovery option alone."

CO₂ recovery option alone. The potential savings at this facility as a result of pollution prevention measures were estimated to be as high as US\$50 million per year. While the savings estimated for the textile plant were much smaller, the recommended actions, including

reusing dye baths and more carefully managing the use of dyes and other raw materials, provided a two-to-one return on investment. In addition, the assessment team identified a number of "areas of potential liability," including old landfills, insufficient secondary containment for aboveground tanks, and inadequate runoff control systems, and recommended addressing these as part of the privatization transaction.

All of the measures identified represent opportunities for considerable cost-savings that can improve the attractiveness of both plants as commercial investments. Even if these projects are not undertaken prior to sale, the plants could still benefit from conducting more thorough engineering and market/feasibility studies prior to sale and including the results in the prospectus for each facility.

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Thailand Is Checking Its EIA Checklist to Combat Pollution

Joel Epstein, Mary Harris, Denny Cruz

The government of Thailand and its institutions are upgrading their capacity to conduct environmental impact assessments (EIAs). To conduct these Initial Environmental Examinations--as they are called in Thailand--for urban infrastructure projects such as landfills and wastewater management systems, the government called on U.S. AID's RHUDB Bangkok and the Regional Support Mission for East Asia. Under agreement with the Asia

Bureau, the Environmental Impact Assessment Technical Assistance Project was initiated under the Environmental Pollution Prevention Project (EP3). As a result of this technical assistance, an EIA Checklist with project-specific guidelines was prepared.

The EIA Checklist provides a concise method for incorporating EIA principles into the development of urban infrastructure projects. The checklist

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PROJECT NEWS

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Tannery Sees Success

Pollution Prevention Recommendations Implemented

Faced with a number of pollution problems, a goatskin tanning facility in Chile needed help. Its effluent contained high levels of chromium, volatile organic compounds (VOCs), suspended solids, biological oxygen demand (BOD), and oil and grease. These high effluent concentrations, along with its excessive water usage and leather waste, prompted the facility to seek assistance. To help assess these problems and recommend possible solutions that would reduce pollution and cut costs, the facility contacted the Chilean office of the Environmental Pollution Prevention Project.

The goatskin tannery produces chrome-tanned suede and grain shoe, garment, and fancy leathers. Dry and green salted skins, as well as wet blue goatskins, are used. Leather from approximately 1000 kg of dried goatskin is produced a day. Wastes generated by the tannery come from the hides and the chemicals used in the production process. A number of batches of wastes are discharged daily.

The EP3 pollution prevention assessment identified a number of opportunities to address the pollution problems at the facility.

If implemented, these recommendations would have a significant environmental and economic benefit to the facility.

Potential Positive Impacts

The pollution prevention actions recommended are based on existing methods that have proven to be cost-effective in commercial applications. However, the facility expected several positive environmental impacts as well.

- Recycle chromium to reduce chromium concentrations in discharges by 80 to 90%. Spent chromium solutions contain about 25% of the total chromium used in tanning. Recycling can decrease the

loss of this valuable material and lower its concentration in the effluent. According to recommendations, some spent chromium solution could be used to make pickling solution without affecting leather quality. The rest could be saved and the chromium precipitated by adding an alkali. Recovered chromium could be dissolved in acid and used in tanning.

- Use water-based lacquers to lower volatile solvent contents significantly. Reducing volatile solvents can decrease VOC releases to the atmosphere by 60 to 75%.
- Recycle final finishes when possible. Extensive washing of the bated goatskin in the tanning process is common. Water from this wash could be used for rinse water in the original soaking. Judicious recycling of rinse waters could result in up to a 50% savings in water consumption.
- Eliminate solid waste discharges by using trimmings to make reconstituted leather. This can ease burdens on landfills.
- Eliminate sulfide discharges. Sulfide-lime solutions and washes from this process can be easily collected, placed in a tank, and sulfides oxidized by air with a manganese sulfate catalyst. This method can destroy sulfide in 4 to 8 hours. Oxidized wastes can be used to control the effluent pH.
- Decrease the amount of suspended solids discharged by 80% and install secondary treatment to decrease BOD. With primary and secondary treatment, the BOD could be reduced by 75%. In addition, reducing suspended solids creates a useable by-product fertilizer, and thus eliminates high disposal costs.

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Government Strategies and Policies Can Promote Pollution Prevention

Industry and government leaders recognize that pollution prevention can have both economic and environmental benefits. Through improvements in industrial performance and environmental protection, pollution prevention approaches can contribute to the sustainable forms of economic development endorsed in UNCED's Agenda 21.

While many countries have had an institutional framework for environmental control for many years, today there is a greater need to move toward a new environmentalism that advocates economic growth, encourages progress, and promotes the adoption of pollution prevention practices by industry and society.

This prevention strategy is based on the premise that interventions should be directed at the conditions and circumstances that create waste and pollution, not at the waste or pollution itself. Eliminating waste and pollution at the point of generation is ultimately the most cost-effective and efficient strategy for environmental protection, for both industry and governments.

It is up to industry to ultimately implement pollution prevention practices; however, government plays a role in accelerating the process and encouraging industry and other sectors to initiate pollution prevention practices and programs. Many countries such as the United States, Australia, Denmark, Germany, United Kingdom, China, and Indonesia are successfully using policies to assist industries with adopting pollution pre-

vention programs. These policies, described in the United Nations Environment Programme's publication, *Government Strategies and Policies for Cleaner Production*, include legislation and policy formulation, financial instruments and information, education, and technical assistance.

To identify how pollution prevention programs and policies can be formulated in Tunisia, the Environmental Pollution Prevention Project (EP3) worked with the Tunisian Ministry of the Environment to gain a clear under-

standing of how the existing system works and how the Tunisian system impacts environmental decisionmaking by Tunisian industry. The final study identified 22 recommendations that will accelerate the development of pollution prevention programs by Tunisia's government.

The report, *Recommendations for a Cleaner Production Strategy in Tunisia*, is available from the EP3 Clearinghouse.

EP3 Tunisia Works With the Environment Ministry to Promote Pollution Prevention



Halima Bali M'rad, information specialist with EP3 Tunisia (right), and Stephen Keach and Kate Perry, with the U.S. Environmental Protection Agency, pose with Tunisia's Ministry of the Environment's mascot, Labib. The three spent two weeks working with the ministry to identify opportunities to promote pollution prevention in existing government environmental programs.

Recommendations made to the ministry included a Government Pollution Prevention Strategy, which involves incorporating pollution prevention in educational programs and using the ministry's depollution fund for financing cleaner production technologies.

EP3 Country News

Tunisia

After only 18 months of service, EP3 Tunisia has made great strides in providing local industries and professionals with pollution prevention expertise and training. The most recent effort was a pollution prevention train-the-trainer course given to 24 participants. Building on the experience they gained in the EP3 Train-The-Trainer workshop held in Washington D.C., in May 1994, a core group at EP3 Tunisia tailored materials to the local context and designed an even more interactive workshop.

During the workshop, participants conducted a mini-audit, reviewed case studies, and worked in small teams to tackle pollution prevention tasks.

One of the highlights of the workshop was a site visit to a factory that had benefited from an earlier EP3 assessment. The metal finishing firm allowed three teams of eight participants to visit the facility. The firm's manager explained that the factory's interest in pollution prevention is based on improving quality while saving costs.

Participants represented a broad range of public and private professions including consulting engineers, academia, professional trainers, engineers, and economists. For more information, contact Rachid Nafti.

Indonesia

EP3 has begun its first year of support to the USAID/Jakarta Mission in developing its clean technology programs. In line with this philosophy, EP3 will assist in developing the Indonesian Clean Industrial Production (ICIP) program. ICIP is the umbrella for coordinating all USAID/Jakarta-assisted clean technology programs. Currently, EP3 is working with the Environmental Improvement Project (EIP), funded through the U.S.-Asia Environmental Partner-

ship (AEP) program, to establish ICIP.

The ICIP staff will consist of a program coordinator and two pollution prevention engineers supported by an office manager and secretary. USAID's efforts support the Government of Indonesia's commitment to pollution prevention as is evidenced by its inclusion in the Sixth Indonesian Five-Year Development Plan and the Second Long-Term Development Plan (Twenty-Five-Year Plan).



EP3 Tunisia and EP3 co-sponsored the Women and NGOs Sfax Conference in September 1994. EP3 Tunisia identified speakers and arranged plant tours.

EP3 will be the main provider to ICIP of technical assistance and service in carrying out ICIP's activities. ICIP will provide direct technical assistance to industries through facility assessments (including follow-up support of up to 1.5 years to facilitate implementation), conduct general and sector-specific training workshops, develop and disseminate information specific to Indonesia, and

provide assistance in selecting appropriate technologies.

ICIP will work closely with the Indonesian Ministry of Industry, BAPEDAL (the Indonesian environmental protection agency), and other Government of Indonesia (GOI) organizations in accomplishing ICIP goals. In addition to GOI liaison, ICIP will work through Indonesian trade organizations, NGOs, and other organizations that have an interest in promoting clean technology in Indonesia. The ICIP project will focus on use of clean, sustainable technology in manufacturing sectors, with the ultimate goal of improved environmental quality. As such, the ICIP program recognizes the need to include strong elements of economic development while retaining a high degree of environmental quality, striking an important balance between the two in one of the world's fastest growing industrial and manufacturing economies. For more information, please contact Maurice Knight.

Ecuador

EP3's Ecuadorian office (E2P3) kicked off its activities on 30 November 1994 with a plan to provide more solutions to Ecuadorian industry needs. Dr. Marco Encalada, E2P3 project director and general manager for Corporación OIKOS, stressed to attendees that addressing environmental concerns is not contradictory to sustainable economic growth. E2P3's role in assisting Ecuadorian industries in preventing environmental pollution was also emphasized.

E2P3 is preparing to sign agreements with the Ecuadorian-American Chamber of Commerce, the Municipality of Quito, and the Environmental Assessment Commission of the Government Department that would authorize the promotion of pollution prevention principles to Ecuador's in-

EP3 Country News

dustrial sectors. E2P3 plans to provide pollution prevention assistance to nine industries in the first six months of 1995. For more information, contact Mario Salazar

Chile

The EP3 Chile program is into its second year of operation. The first year's activities focused on pilot demonstration projects in a variety of Chilean industrial sectors. To date, over 16 diagnostic studies have been done, and implementation of many pollution prevention recommendations is under way. Industries that participated in 1994 studies include tanneries, slaughterhouses, graphics printers, paint manufacturers, and food industries. In 1995, EP3 Chile will focus on minerals processing industries, chemical and food industries, hospitals and clinics, and hotels.

Through all its efforts, EP3 Chile has made progress in helping to reduce toxic waste generation and water consumption by Chilean industries. These industries also expressed a need for further training at the operator level. For more information, contact Maurice Knight.

Sri Lanka

In February 1995, EP3 initiated activities in Sri Lanka, where EP3 is collaborating with other donor and AID projects to assist the National Development Bank (NDB) in incorporating environmental considerations into its industrial loan program. EP3 is developing procedures for evaluating the extent to which applicants are building pollution prevention into their proposed investments. Under the project, EP3 will train NDB personnel, local consultants and industries on the benefits of pollution prevention and how to assess and pursue opportunities for using this approach. EP3 will assist bank personnel in reviewing initial applications to test the procedures and will adjust them

as needed. For more information, please contact Raghu Rahgavan.

Egypt

EP3's project in Egypt (EP3 Egypt) is in its sixth month of operation and the project has already completed ten full-scale pollution prevention assessments (Round 1). Low-cost and no-cost measures are already being undertaken at half of the facilities. Two of EP3 Egypt's local counterpart agencies, the Tabbin Institute for Metallurgical Studies (TIMS) and the

diagnostic assessments and identifying opportunities for installing equipment that would reduce pollution at plants assessed in Round 1. In addition to the technical assistance activities planned, training sessions focusing on the textile and metal finishing industries are scheduled for later this year. In addition, a Decisionmakers' Workshop is scheduled for July that will focus on the economic benefits associated with implementing pollution prevention programs.

EP3 participated in the Energy Conservation and Environment Project's



EP3 Chile Office Director, Jorge David (standing, center), was one of three facilitators of a pollution prevention workshop in Buenos Aires, Argentina, in November 1994.

Development Research and Technological Planning Center (DRTPC), are conducting pollution prevention diagnostic assessments and assisting facilities with follow-up. The Federation of Egyptian Industries (FEI) is responsible for the clearinghouse and coordination of all pollution prevention workshops and training courses. EP3 Egypt staff are supporting these activities.

In April, EP3 will assist the implementing agencies in screening candidates for Round 2 pollution prevention

(ECEP) International Conference: Technologies for Energy Efficiency and Environmental Protection in late March 1995. EP3 sponsored presentations by three U.S. experts on applying pollution prevention techniques and using clean technologies in several U.S. industries. For more information, please contact Mohammad Latif.

Thailand

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poses key questions to aid in the identification of specific impacts that could result from such projects.

If an environmental impact is identified, the project-specific guidelines ask the analyst to determine the following:

- The data required for the assessment;
- The communications necessary to ensure intergovernmental coordination;
- An estimate of the costs for mitigation and operation/maintenance of the facilities; and
- Specific public information and involvement procedures to minimize socioeconomic impacts and reduce community concerns.

To develop the checklist, the EIA project team conducted approximately 15 meetings and site visits in Bangkok and the provinces of Nonthaburi and Ubon Ratchathani.

The project team then researched and analyzed two case studies: the development of a solid waste facility in Nonthaburi and a wastewater management system in Ubon Ratchathani. The case studies contained background information on the project and its locale, existing practices and facilities, and plans for the new facilities. From these case studies, the project team identified significant issues related to the development of these specific facilities and implications for other solid waste and wastewater management projects elsewhere in Thailand.

Joel Epstein is an environmental planning specialist with RCG/Hagler Bailly, Inc., and served as the project team leader; Mary Harris is an environmental impact specialist with RCG/Hagler Bailly; and Denny Cruz is an environmental engineer with the U.S. EPA.

Clearinghouse Bulletin Board

New Clearinghouses Opened

EP3's last newsletter announced that there were three EP3 Clearinghouses: the Headquarters (HQ) Clearinghouse in Arlington, Virginia; one in Chile; and one in Tunisia. Since then, two new clearinghouses have been opened--in Ecuador and Egypt; another clearinghouse in Indonesia is being planned.

Clearinghouse users in Chile, Ecuador, Tunisia, and Egypt should contact their local clearinghouse. Users in non-EP3 countries should contact the EP3 Headquarters clearinghouse by fax or internet.

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Clearinghouse Managers Receive Training

In late October-early November 1994, representatives of the clearinghouses in Chile, Ecuador, and Egypt visited the U.S. to learn about clearinghouse management and pollution prevention. Their first stop was at the HQ Clearinghouse in Arlington for a one-day orientation and training workshop on setting up and operating an EP3 clearinghouse. The sessions covered assembling and organizing the basic collection, the software used to catalogue the collection, developing the resources to respond to local needs, publicizing the clearinghouse, and generating demand for its services. The last session was important because the clearinghouses, like other components of

the EP3 project, must become self-sustaining eventually.

The next four days were spent at the National Pollution Prevention Roundtable in Minneapolis, Minnesota. The first day featured pollution prevention as it relates to training and assessments. Sessions on subsequent days ranged from the introduction of pollution prevention concepts in higher education to solid waste source reduction to technical assistance opportunities in specific industries. The final day was devoted to visits to two clearinghouses in Minneapolis. In conjunction with the Roundtable, meetings were arranged to enable the EP3 participants to meet and network with their U.S. counterparts.

What's WEF Got To Do With EP3?

The Water Environment Federation (WEF) brings one thing to the Environmental Pollution Prevention Project (EP3)—experience. However, the scope of this experience is very broad. With its international networking, volunteer recruitment and management, and information dissemination experience, WEF is a uniquely qualified partner in EP3.

Since 1932, when WEF's first non-U. S. Member Association (MA) was established, the Federation has gained over 2000 individual members from countries outside the U.S., developed 20 non-U.S. MAs, established affiliations with 3 non-U.S. organizations, and entered into several cooperative agreements to further its international scope. These international links have allowed WEF to quickly and effectively disseminate EP3's pollution prevention information and training, and establish links between EP3 and some of WEF's MAs.

With developing and disseminating technical information and training as its own primary goal, WEF provides EP3

with the expertise and resources necessary to develop and produce technical information and training materials. WEF also helps promote the project and the availability of such technical materials through WEF's and affiliated organizations' publications.

But probably one of WEF's most important roles is the recruitment of volunteer industry experts to support EP3 activities. With its existing database of industry experts, experience with on-going technical exchange programs, and access to experts in affiliated organizations, WEF can provide EP3 with on-going technical support and expertise. WEF has also provided many of the project's volunteers through its EP3 volunteer database.

The Water Environment Federation is an international educational and technical organization of over 41,000 water quality professionals. WEF members include civil, chemical and environmental engineers; biologists; government officials; chemists; equipment manufacturers and suppliers; and students.

WEF's Other Talent—Training

Aside from providing technical information and volunteer support, WEF itself has been active in providing pollution prevention and pretreatment training to a cross-section of professionals in Eastern Europe and Latin America.

On 8 November, 1994, EP3, WEF, and the Asociación Argentina de Preservación del Agua y su Medio Ambiente co-sponsored a pollution prevention workshop in Buenos Aires, Argentina. Thirty-five participants from academia, media, government, and industry attended the workshop. The course focused on identifying pollution prevention opportunities, pollution prevention methods, and changing management philosophy to support the implementation of such methods. The course was facilitated by three Chilean specialists who were trained in an EP3 Train-The-Trainer course held in Arlington, Virginia, in May 1994.

On 6 and 7 December, 1994, WEF's EP3 Director, Marlou Tomkinson, and two WEF members, William Hancuff and Tom Herman, conducted a two-day pollution prevention and pretreatment workshop in Warsaw, Poland. Workshop participants included representatives from Poland's industrial and engineering communities, and government.

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In December 1994, EP3 Chile's project coordinator visited the facility to discuss these recommendations and offer assistance in implementing a plan. But, facility personnel had implemented several of the recommendations already.

To precipitate chrome from wastewater, alkali is added. Then the chrome can be reused in the tanning process. By recycling chrome, the facility saves on raw material costs and reduces chrome in the wastestream from 1 g/L to 0.3 g/L. While the plant is pleased with this cost-savings, it is committed to continuously improving techniques to reduce chrome.

Shifting to water-based lacquers has reduced VOC emissions by 50%. Where solvent-based lacquers must be used, the lacquer:solvent ratio has been tightened to decrease VOCs even more.

By switching from continuous flow rinsing to batch, the volume of process water was decreased by 50%. The facility is investigating purchasing an automatic hydraulic system to further control the batch rinse process. Because the hydraulic system is a large capital investment, EP3 and plant engineers are evaluating whether the benefits of such a system outweigh its cost.

Solid wastes are currently sent to landfills; however, the facility is considering several industrial applications for hair such as filler material for brick industries, fertilizer, and soil conditioners.

By removing flesh residues more effectively before dehairing, sulfide use is reduced. Amine applications during the dehairing process also reduce the need for sulfides. By implementing these two recommendations, sulfide generation was reduced by 50%. In the future, the facility will use an enzymatic dehairing process to reduce sulfide discharges even more.

Conferences and Events

Toxic Substances in Water Environments: Assessment and Control

14 - 17 May, 1995
Cincinnati, Ohio, U.S.A.
Specialty Conference Series; Contact The Water Environment Federation; 601 Wythe St., Alexandria, VA 22314-1994;
tel: +1(703)684-2400
fax +1(703)684-2492

International Conference on Industrial Waste Minimization '95

25 - 29 November, 1995
Taipei, Taiwan, R.O.C.
Sponsored by Graduate Institute of Environment Engineering, National Taiwan University, No. 71, Chou-Sun Rd., Taipei, Taiwan, R.O.C.;
tel: 886-2-3622510
fax: 886-2-3661642

7th International Conference on Rainwater Catchment Systems

19 - 25 June, 1995
Beijing, P.R. China

Contact: Mr. Mou Haisheng,
Department of Hydrology, Institute of Geography, CAS,
Building 917, Datun Rd.,
Anwai, Beijing 100101, P.R. China;
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WEFTEC'95, Water Environment Federation 68th Annual Conference and Exposition

21- 25 October, 1995
Miami, Florida, U.S.A.
Contact: Water Environment Federation, 601 Wythe St., Alexandria, VA 22314-1994;
tel: +1-703-684-2464
fax: +1-703-684-2492

3rd National Hazardous and Solid Waste Convention and Trade Exhibition

26 - 30 May, 1996
Sydney Convention & Exhibition Centre
Sydney, Australia
Contact: Convention Secretariat,
P.O. Box 388,

Artarmon NSW 2064;
tel: +61-2-4131288
fax: +61-2-413 1047

National Pollution Prevention Roundtable, 1995 Spring Conference

2 - 5 April, 1995
Austin, Texas, U.S.A.
Sponsored by the National Pollution Prevention Roundtable,
218 D St., Washington, D.C., 20003;
tel: +1-202-543-7272
fax: +1-202-543-3844

1st Industrial Energy Efficiency Symposium & Expo

1 - 3 May, 1995
Washington, D.C.
Contact: Energetics, Inc.,
7164 Gateway Dr.,
Columbia, Maryland, 21046.

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