

**NATIONAL WORKSHOPS ON TOXIC AND HAZARDOUS
WASTE MANAGEMENT**

TECHNICAL RESOURCES PROJECT (GRANT NO. 497-0432)

FINAL REPORT

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DISCLAIMER

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1. EXECUTIVE SUMMARY

From July 1992 to January 1993, the World Environment Center (WEC) under a grant from the U.S. Agency for International Development, Philippines, conducted a series of National Workshops on Toxic and Hazardous Waste Management. The program was composed of three activities: The Consultative Forum on the Implementation of RA 6969; The National Workshop on Methods for Hazardous Waste Inventory; and A Workshop on Waste Minimization: An Emerging Corporate Strategy. The national forum and workshops funded under this grant were intended to assist the Department of Environment and Natural Resources, Environmental Management Bureau (DENR/EMB) to inform and involve other government agencies, the private sector, and non-governmental organizations regarding Republic Act 6969, and assist in the development and implementation of an action plan for toxic and hazardous waste management.

Based on the experiences and observations of the workshop and forum facilitators and instructors, feedback from participants, and discussions with DENR/EMB, the following general recommendations are made for action by the Government of the Philippines:

- endorse the Consultative Forum Steering Committee and continue to involve NGOs, academia and industry in the implementation of RA 6969;
- increase budget allocations for the implementation of RA 6969;
- establish a resource/information dissemination center;
- conduct a follow-up inventory workshop;
- establish a waste minimization advisory committee;
- conduct a capability assessment of Philippine institutions for promoting waste minimization; and
- provide further training and technical assistance in waste minimization.

Based on the workshop results and recommendations and further discussions with DENR/EMB, WEC was requested to identify potential follow-up technical assistance activities, studies and training, and provide general scopes of work for these activities. The principal recommendations for specific follow-up by USAID and DENR/EMB are:

- conduct a follow-up Hazardous Waste Inventory Workshop and provide a short-term technical advisor to DENR/EMB to assist in finalizing the inventory;
- conduct a capabilities assessment of waste minimization technical assistance organizations;
- develop an Office of Technical Assistance pilot project;
- provide additional waste minimization training, particularly to the regions; and
- conduct regional waste minimization pilot projects.

2. HAZARDOUS WASTE IN THE PHILIPPINES:

2.1 SUMMARY AND OVERVIEW

While rapid industrial development in the Philippines provides an opportunity for national recovery and economic growth, pollution from industrial sources is jeopardizing the nation's ability to sustain broad-based economic development through its hazardous effects on human health, social welfare and environmental quality. A significant portion of the waste coming from industry can be classified as toxic and hazardous. Because of the severity of health and environmental impacts that these wastes may inflict, they require special handling and management procedures. Most of the solid and hazardous waste generated in the Philippines is still improperly stored, transported and disposed. Facilities for treatment and disposal of hazardous waste have not yet been developed.

The relatively low level of awareness of the volume and toxicity hazardous wastes makes the problem seem to be remote and irrelevant. Yet in the long term, toxic and hazardous materials may have more far-reaching negative effects on society than other environmental problems.

2.1.1 Hazardous Wastes Management

In addition to the lack of specific facilities for treating and disposing of hazardous wastes, management of hazardous wastes in the Philippines is hampered by several other factors. First, the traditional regulatory framework on air and water quality is not adequate to tackle the pollution problems posed by hazardous wastes. Second, the Government of the Philippines' enforcement capability is limited. This limitation is partly due to the lack of an adequate data base on the nature, magnitude and distribution of hazardous wastes. In addition, most of the DENR field staff, having previously specialized in forestry concerns, are just beginning to develop their knowledge and skills on industrial environmental problems, including toxic and hazardous wastes. Third, neither the public nor the private sectors have been able to adequately plan for or implement waste minimization programs as a supplement and alternative measures for preventing pollution. This is in large part due to the lack of access to information on waste minimization technologies and practices.

2.1.2 Republic Act 6969

Previous studies on the problems of hazardous wastes in the Philippines indicate the need to develop a comprehensive national plan for the management of hazardous wastes. The "Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990" (Republic Act 6969) which was enacted in October 1990, provides the legal basis for the preparation of this comprehensive plan. The DENR through its regional technical offices, as well as the Environmental Management Bureau (EMB), is responsible for enforcing this law.

2.1.3 U.S. Agency for International Development

The U.S. Agency for International Development (USAID) has played a significant role in encouraging environmental awareness and in strengthening of institutions, policy, and practices

for industrial and hazardous waste management in the Philippines. Presently, USAID and DENR are jointly sponsoring the Industrial Environmental Management Project (IEMP). The goal of this 52 month project is to encourage sustained economic growth in the industrial sector, while reducing environmental degradation and environmental health-related problems. The IEMP is expected to achieve measurable reduction in the generation of industrial emissions and wastes at a number of industrial sites in the Philippines.

2.1.4 Previous USAID-WEC Collaboration in the Philippines

WEC has, since 1987, undertaken more than a dozen USAID funded initiatives that compliment USAID/Philippines goals for improving hazardous waste management. These include:

- 2/87 Audit: Small-Scale Mining Process Specialist:** Rita Ewing, BHP, Utah International
- 8/87 Industrial Health, Safety, and Pollution Control Program Development and Follow-up:** Antony G. Marcil
- 1-4/88 Industrial Waste Management Training in the U.S.:** Antoliano C. Diaz, Manager, Environmental Management Services, San Miguel Corporation
- 6/88 Hazardous Waste Landfill Design Course:** Maria Lourdos Gorobia, Pollution Control Technologist, DENR
- 2/89 Chulabhorn Research Institute Risk Assessment Workshop, Bangkok:** Angelita T. Brabante, Chief, Toxic Chemicals and Hazardous Waste Section, EMB (invited, but could not attend)
- 4/89 Pacific Basin Conference on Hazardous Waste, Singapore:** Rachel Vasquez, DENR
- 11/90 Pacific Basin Conference on Hazardous Waste:** Dr. Corazon Claudio, President, Technology, Risk and Development Foundation, Inc.
- 4/90 Assessment of Tanneries:** Dr. Thomas Thorstensen, Consultant
- 5/91 Assessment of Microelectric/Semiconductor Plants:** Edward Sawicki, President, Micro-Safe Inc., San Jose, California
- 7/92 Waste Minimization Institutional Assessment:** Tim Greiner, Massachusetts Office of Technical Assistance
- 7/92-1/93 Nation Workshops on Toxic and Hazardous Waste Management (1 Forum, 2 Workshops)**
- 3/93 PBE Conference: Corporate Environmental Policies and Programs:** David Chittick, Environmental and Safety Engineering Vice President, AT&T; Burton Hamner, Environmental Planner, Washington Department of Ecology

3. NATIONAL WORKSHOPS ON TOXIC AND HAZARDOUS WASTE MANAGEMENT

3.1 HAZARDOUS WASTE GRANT TO THE WORLD ENVIRONMENT CENTER

On March 17, 1992, the U.S. Agency for International Development, Philippines (USAID/Philippines), under its Technical Resources Project, issued Grant No. AID 492-0432-G-SS-2070-00 to the World Environment Center (WEC) in the amount of \$100,000 to implement a series of National Workshops on Toxic and Hazardous Wastes Management and provide assistance to the DENR/EMB. The national forum and workshops funded under this grant were intended to assist DENR/EMB in informing and involving other government agencies, the private sector and non-governmental organizations regarding RA 6969, and thereby aid in the development and implementation of an action plan for toxic and hazardous wastes management.

3.1.1 Forum and Workshops

This project was composed of three activities, namely:

1. **The Consultative Forum on the Implementation of RA 6969
July 17-19, 1992**
2. **The National Workshop on Methods for Hazardous Waste Inventory
September 21-25, 1992**
3. **A Workshop on Waste Minimization: An Emerging Corporate Strategy
January 18-22, 1993**

The specific objectives of this project were to:

- provide opportunities for the collaboration of government, industry and environmental organizations in drafting the implementing regulations for the toxic and hazardous waste management law;
- develop appropriate approaches for conducting hazardous waste survey and inventories specific to the Philippines;
- strengthen the technical capabilities of the EMB and the DENR Regional Offices to survey and inventory hazardous wastes;
- formulate recommendations for the preparation of a comprehensive and implementable process of conducting a national hazardous waste survey and inventory;
- foster a greater understanding of waste minimization and clean production processes by technical staff of the DENR and Department of Trade and Industry (DTI), as well as the industrial sector;
- provide participating institutions with additional information on the institutional legislative and administrative options for managing hazardous wastes adopted utilizing the successful experience of other countries; and

- identify appropriate hazardous waste treatment and disposal technologies for the Philippines.

The forum and workshops were attended by key personnel from both the public and private sector involved in the management of hazardous and toxic wastes. The DENR also utilized the workshops as a training opportunity for its own staff as well as that of the private sector.

3.1.2. Tasks

For each of the workshops and forum, WEC performed the following tasks:

- prepared an implementation plan;
- prepared and delivered background specialty papers as well as training materials on hazardous wastes;
- provided expert advice and assistance to workshop/forum participants in the identification of key issues and in the conceptualization of appropriate actions to address them;
- provided training in complementary exercises such as plant visits and assessments; and
- documented and published workshop and forum proceedings.

In accomplishing these tasks, WEC provided the services of expert staff with experience in planning and coordination of hazardous waste management programs as well as skills in pollution inventories, plant appraisals and risk assessments. To help provide these services, WEC entered into a subagreement with the East-West Center's Pacific Basin Consortium for Hazardous Waste Research for the Hazardous Wastes Inventory Workshop.

3.1.3. Reporting

Specifically, WEC submitted the following reports to DENR/EMB and USAID/Philippines:

- *The State of Hazardous Waste Management in the Philippines* (Draft Final Report, Cirillo, R.R., et al; July 1993).
- *Report on the Consultative Forum in the Implementation of RA 6969* (Final Report, March 1993).
- *Report on the National Workshop on Methods for Hazardous Waste Inventory* (Draft Report, Barnes, D.; November 1992, to be finalized July 1993).
- *A Workshop on Waste Minimization: An Emerging Corporate Strategy* (Final Report, Hamner, B., March 1993).
- *A Workshop on Waste Minimization: An Emerging Corporate Strategy* (Draft Final Report, Gozun B., March 1993, to be finalized July 1993).
- *National Workshops on Toxic and Hazardous Waste Management* (Draft Final Report, July 1993).

3.1.4 Follow-up Activities

Based on the workshop results and discussions with DENR/EMB, WEC was requested to assist the DENR/EMB in the preparation of general scopes of work for follow-up technical assistance, studies and training. The following recommendations for follow-up activities are

made:

- Conduct a Follow-up Hazardous Waste Inventory Workshop and Provide a Short-term Technical Advisor to DENR/EMB
- Conduct a Capabilities Assessment of Waste Minimization Technical Assistance Organizations
- Initiate an Office of Technical Assistance Pilot Project
- Provide Additional Waste Minimization Training
- Conduct Regional Waste Minimization Pilot Projects

4. CONCLUSIONS AND FINDINGS

The conclusions below are based on the experiences of the workshop and forum facilitators and instructors and on feedback and discussions with participants and DENR/EMB. They are divided into specific observations about Republic Act 6969 and hazardous waste inventories and general observations about waste minimization in the Philippines.

4.1 REPUBLIC ACT 6969

Implementation Steering Committee The Consultative Forum proved to be an effective vehicle in soliciting meaningful and realistic suggestions on how to effectively implement RA 6969. All four participating groups (industry, NGOs, academia, and government) displayed a lot of enthusiasm and genuine concern about how their group can assist DENR in the initial stages of implementation of RA 6969. This sincere intention was manifested by the creation of the Steering Committee by the body during the Consultative Forum.

Budgetary Constraints If the Philippines is to see a successful transition to managing the toxic and hazardous wastes in the country, implementation of RA 6969 cannot be conditional. Toxic substances and hazardous wastes will proliferate in the environment unabated if the implementing regulatory agency lacks the needed technical resources. Full enforcement cannot be possible unless the agency is given enough of a budget to hire highly qualified technocrats. Acquiring the necessary materials such as laboratory facilities and testing equipment will also be difficult.

Constraints of the Implementing Agency The Environmental Management Bureau (EMB) has been commissioned to implement RA 6969. Unfortunately, this responsibility was handed over without the benefit of transition measures such as increasing the number of highly specialized technical staff in the Chemical and Waste Management Section, upgrading of the laboratory facilities and provision of adequate hands-on training of the laboratory staff.

Continuous Information Dissemination and Successful Implementation An information dissemination program is a vital link between the local government officials who are in position to oversee direct on-going activities within their jurisdictions. Of late, these officials have been empowered by the Local Government Code of the Philippines to implement laws originally vested solely on specific government institutions. The community has to be properly updated on the latest government plans and programs, especially those concerning public health and welfare, in order to avoid delays in program implementation.

Confidentiality of Information Industrial growth in the Philippines is dynamic and very competitive. Industry cannot divulge the results of their continuing research on product development and process and raw material compositions, without the assurance of confidentiality on the part of the government. No business person will voluntarily submit information that will jeopardize his/her business.

Length of Notification Time The time frame of 180 days stated in the IRR is not practical, workable, or fair in light of industrial productivity and competition. The IRR of RA 696 also requires the submission of about twenty-eight properties or characteristics for each chemical substance. Small scale industries will find this difficult to comply with.

Added Costs to Industry Due to the absence of clear and precise classifications of toxic chemicals and hazardous materials, chances are that industries using chemical substances will be taxed at rates that are too high. Until the IRR and guidelines are in place, implementation of the law might be on a catch and pay system. The lack of technical expertise and locally available technical information may also be problematic.

4.2 HAZARDOUS WASTE INVENTORY

National Inventory of Hazardous Wastes There is no regional or national inventory of hazardous wastes. An inventory is required for the development of government policies and programs for planning hazardous waste treatment and disposal facilities, and for integration of waste management within wider management issues. The inventory itself is only a supporting part of an overall waste management program. The long term preferred approach to waste management has to be waste minimization, with treatment and disposal only to be used for waste for which reduction, reuse, or recovery are not possible.

Priority Wastes The priority waste groups as identified by the delegates of the Hazardous Waste Inventory Workshop are: metal finishing wastes, organic solvents, and acids and alkalies. Wastes considered by the delegates to be of little consequence to the Philippines included: reactive wastes, waste containers, putrescible wastes, and oily organic wastes. The delegates also concluded that little waste is generated from the pesticide, pharmaceutical and textile industries. (However, in view of the importance of textile exportation, it was agreed that waste generation from the textile industry requires independent checking.)

Rapid Assessment Methodology The Rapid Assessment Methodology can only be used as a general guideline for estimating hazardous waste generation. The methodology appears to overestimate the volumes of waste generated. Discussions should be held with the relevant organizations to investigate redelimitation of the classifications.

4.3 WASTE MINIMIZATION

Waste Minimization in the Philippines Waste minimization is readily understood as a concept by Philippine industry and government and waste minimization training as practiced in the workshop is effective. The government has existing authority to require waste minimization planning from industry using various existing regulatory mechanisms. In addition, there are numerous resources available to promote and institutionalize waste minimization. Most progress in waste minimization will be made by transferring waste minimization knowledge, not

technology. However, the technologies most important for waste minimization in the Philippines include, sensors, automation, information systems and recycling systems such as solvent distillers and wastewater reclamation.

Priority Wastes Rather than solid toxic waste, the main industrial waste problem in the Philippines appears to be wastewater with high BOD or thermal gradients. This finding is based on the volume and nature of the wastes and their immediate threat to health and the environment. While there certainly is substantial generation of toxic waste, a major means of disposal appears to be through water flushing or rinsing. This has several implications. The first is that waste minimization needs to explicitly promote water conservation and wastewater reduction, as well as solid waste minimization. Second, Toxics Use Reduction (TUR) may be a lower priority for waste minimization training and transfer in the Philippines than the U.S., since use reduction is not as applicable a concept for industries with high-BOD waste streams derived from food processing or agriculture.

Waste Minimization Incentives The incentives for waste minimization were clearly and quickly realized by the workshop participants. The group discussion on the real short-term and long-term costs of waste management was enough to get participants seriously motivated, especially in industry. Industry representatives clearly felt that waste minimization would benefit them and also help alleviate regulatory pressures, through agreements such as phased compliance dependent on waste minimization success. Waste minimization was clearly seen as a win-win situation for industry and government on all levels. Waste minimization is therefore much easier to sell politically than a "cradle-to-grave" waste management regulatory program.

Barriers to Waste Minimization Barriers to waste minimization in the Philippines include industry's lack of knowledge about existing waste streams, lack of waste minimization concepts and methods, and lack of model government/industry cooperative projects.

Management Information and Control Technology Site visits by the course instructor confirmed that Philippine industries operate with significantly less management information about the control of industrial processes than U.S. industry. In the U.S., automation, computers and sensors make it possible to continually collect and process information about inputs and outputs, including wastes. Additionally, a long history of regulation ensures that most businesses can at least quantify and characterize their hazardous wastes. In the Philippines, the lack of process control technology and the lack of reporting requirements for wastes means that cost-effective waste minimization opportunities are often not even noticed by management.

5. RECOMMENDATIONS

The recommendations below are based on the experiences and observations of the workshop and forum facilitators and instructors and on feedback and discussions with participants and DENR/EMB.

1. **Endorse the Consultative Forum Steering Committee and Continue to Involve NGOs, Academia and Industry** DENR should strongly and officially endorse the Steering Committee created during the Forum. This committee, compelled by the desire to voluntarily serve the DENR, should be recognized as a working partner of the

government. In addition, DENR should maintain close liaison with NGOs, academia and the industrial sector, before embarking on revisions or new legislation. This will afford a more open and harmonious review of policies and programs by all concerned groups.

2. **Increase Budget Allocations for the Implementation of RA 6969** The budget allocation specifically for the implementation of RA 6969 should be increased. This should include an increase in the technical staff of EMB. In addition fines and permit fees collected and administered by the DENR as mandated by RA 6969 should be devoted to projects and research activities relative to toxic and hazardous waste management. DENR should formulate research designs to their needs, and sub-contract the implementation of the projects to deserving and highly credible management and consulting offices.
3. **Establish a Resource/Information Dissemination Center** A resource center or library, focused on documents and training materials, should be developed. The National Technology Center is one possibility. Funding for the center could be generated by a small fee imposed on all manufacturers who stand to benefit from use of the center, Such a center would need to be staffed by individuals who have a strong personal interest in the topic. The center staff should be ready to serve as technical advisors to business.
4. **Include Specific Confidentiality Provisions in the IRR** While information on emissions from factory premises and concern over potential hazards within factory premises is of public concern, due respect for proprietary processing of information should be given. Clear guidelines for information control and disclosure should be promulgated and strictly adhered to.
5. **Shorten Notification Time of Application of New Chemicals** DENR should initiate expeditious measures to shorten the processing time of applications for registration of new chemicals. Unless this provision is carefully implemented, the business sector might view RA 6969 as another piece of legislation subject to abuse, graft and corruption, and that will cause unnecessary delays in the development of the country.
6. **Simplify, Prioritize and Clarify Listing of Wastes** There should be some simplification and prioritization of the listing of wastes in RA 6969. In addition, the chemical registration form should be revised and made more user friendly. There should be a clearer delineation of water pollution and hazardous waste management issues. Currently, there is some confusion about the intent of RA 6969 in regards to the management of residues.
7. **Develop a Leachate Testing Apparatus and Disposal Site for Metal Containing Sludges** A disposal site is urgently needed for metal containing sludges. The approval system should be facilitated to fast track the operation of a suitable secure landfill site. In addition, a leachate testing apparatus such as recommended by the USEPA should be developed to test all stored sludges to ascertain their suitability for landfill disposal.
8. **Conduct a Follow-up Inventory Workshop and Provide Short-term Technical Assistance** A follow-up workshop should be held to report on progress towards the national waste inventory and registration under RA 6969. In addition to the follow-up

workshop, a short-term advisor should be placed with DENR/EMB to assist them in finalizing their inventory of chemicals by the December 31, 1993 deadline.

9. **Establish a Waste Minimization Advisory Committee** Use the initial volunteers from the waste minimization workshop to establish a waste minimization advisory or oversight committee. The initial volunteers should form an executive steering group. The membership should be expanded eventually to include NGOs, state economic development agencies and academics, particularly from the University of the Philippines and the Asian Institute of Management. The committee officials should be given recognition and resources to enable them to meet quarterly and to continue promoting waste minimization. Special effort should be made to enlist active, energetic people as members so they will take personal initiative in promoting waste minimization projects.
10. **Clarify the Definition of Waste Minimization for the Philippines** An official functional definition of waste minimization should be established that includes source reduction and recycling. Constant vigilance is necessary to ensure that waste treatment is not being disguised as waste minimization. Many U.S. companies have proposed waste treatment as their solution to waste minimization without doing an adequate job of "going upstream" to source reduction. This is why the functional definition needs to include a specific analysis order as well as a list of elements to consider. In addition, waste minimization should be established as a formal government policy in both environmental management and in economic development.
11. **Conduct a Capability Assessment** A capability assessment of Philippine institutions, including business, public NGOs, academia, and government agencies should be conducted to determine how to best promote waste minimization in the long term. The existing resources available for waste minimization in the Philippines should be evaluated for their true capability to promote waste minimization. Capability evaluations should address the alignment of waste minimization with the mission of the organization, available resources, and linkage to other resources and organizations. The potential output should include a proposal for actions by each resource organization. This will help determine the location of technical assistance and resource centers.
12. **Provide Further Training in Waste Minimization** Training in waste minimization assessment procedures, program development and implementation, and total quality environmental management should be provided. Training needs to be made highly participatory using principles of group discussion, team problem solving, and field exercises. The classes should be taught by people who have done actual site visits themselves and can discuss the basic technical as well as organizational issues involved in waste minimization. Training should be provided on a regional basis. An excellent start would be establishing/implementing a training sequence in each of the DENR's 14 regions. The training should be attended by DENR inspectors and officials, local NGOs and economic development authorities. It must be re-emphasized that waste minimization training is not very complicated, but it must be delivered with enthusiasm and vision as a new way of improving both profits and the environment.
13. **Implement Regional Waste Minimization Projects** A pilot waste minimization project should be implemented in each DENR region under the supervision of the Regional

Technical Director. The project should be linked to compliance and certification to give all parties practice in institutionalizing the mechanisms for achieving waste minimization. The ideal recommended project would have a priority facility with good waste minimization potential, and have prepared a thorough waste minimization action plan. A year should be given to complete the plan, and support for planning should be provided to each facility from the IEMP PMA team. The PMA team should only teach and suggest; the facility has to come up with the answers on their own for the concepts to be truly internalized. A key focus of the PMA team should be on current and alternative costs so that at the end of the project, the facility is motivated to implement waste minimization actions in the interest of potential cost savings. The project should be well documented to ensure that quality success stories can be written at the end. High recognition should be given to facility managers throughout the pilot project to keep them motivated and concerned about their success.

14. **Collect Successful Waste Minimization Case Studies from Philippine Industry** Philippine specific waste minimization success stories need to be collected. Many businesses are willing to share their successes if it results in marketable publicity. Local media sources are a particularly good way to collect success stories. A contest could be held for reporters who write about success stories, with a prize to the top three or four. Even those who don't win would provide good material for promoting waste minimization. Another resource is university journalism students, who may be eager to take advantage of the relative newness of waste minimization to establish a niche in this area. Under faculty supervision, students can write success stories as class projects. A standard format should be established and used for distribution by the government or waste minimization resource center.
15. **Learn from the Experiences of Other Asian Countries** Resource speakers from developing countries in the Asia region should participate in forthcoming workshops since they may have a better understanding of the economic and cultural issues and constraints facing the Philippines.

6. FOLLOW-UP PROGRAMS

Scopes of Work

Based on the workshop results and discussions with DENR/EMB, WEC was requested to assist the DENR/EMB in the preparation of general scopes of work for follow-up technical assistance, studies and training. The recommendations for follow-up activities by DENR/EMB are:

- Conduct a Follow-up Hazardous Waste Inventory Workshop and Provide a Short-term Technical Advisor to DENR/EMB
- Conduct a Capabilities Assessment of Waste Minimization Technical Assistance Organizations
- Initiate an Office of Technical Assistance Pilot Project
- Provide Additional Waste Minimization Training
- Conduct Regional Waste Minimization Pilot Projects

6.1 FOLLOW-UP HAZARDOUS WASTE INVENTORY WORKSHOP AND SHORT TERM TECHNICAL ADVISOR

Introduction We recommend that a follow-up hazardous waste inventory workshop (2-3 days) be conducted prior to the December 31, 1993 deadline to report on the progress towards finalizing the national hazardous waste inventory and that a short-term (4-6 weeks) advisor be provided to DENR/EMB to assist them in preparing the final inventory. The short-term advisor should be involved in facilitating and leading the workshop.

Objectives

- follow-up on recommendations from the first Hazardous Wastes Inventory Workshop and report on the progress of the finalization of the national hazardous waste inventory;
- provide delegates the opportunity to present the results of their assignments in determining local waste generation rates and develop a revised methodology for waste inventory based upon those results;
- validate (or otherwise evaluate) the rapid assessment method for waste inventory;
- provide a forum of continued participation for industry, NGOs and academia;
- provide DENR/EMB with an on-site advisor to assist them on activities related to the hazardous waste inventory.

General Tasks and Schedule

Select Expert

1 month

- Select senior advisor from among government/industry experts to serve as the workshop leader and DENR/EMB advisor.

Review Existing Inventory

2 weeks

- Senior advisor travels to Manila to review progress of the finalization of the hazardous waste inventory with DENR/EMB. Senior advisor prepares background paper for workshop on status and progress of inventory, and identifies key gaps. DENR/EMB and senior advisor coordinate with past delegates the results of their assignments to determine local waste generation rates.

Develop Workshop Agenda

2 weeks

- DENR/EMB develop workshop agenda with senior expert.

Convene Workshop

2-3 days

- Convene workshop to reach consensus on methodology for completing the inventory and develop general guidelines. Host the Workshop through delivery of background/specialty papers, provide expert advise and assistance to workshop participants on key issues. Conduct a review and evaluation of the rapid assessments method for waste inventory; assist in improving the methodology for waste inventory based on delegate reports; in cooperation with delegates and DENR/EMB develop detailed recommendations for hazardous waste management implementation.

Follow-up on Workshop Recommendations

2-4 weeks

- Submit a report on the workshop proceedings assessing the outcome of the workshop and suggestions for follow-on technical assistance.

Provide Technical Assistance to DENR/EMB

- Work with DENR/EMB to finalize inventory and advise them on key areas for which assistance is requested.

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6.2 WASTE MINIMIZATION ORGANIZATIONAL CAPABILITIES ASSESSMENT

Introduction A capability assessment of Philippine institutions, including business, public NGO's, academia, and government agencies should be conducted to determine how to best promote waste minimization in the long term. The existing resources available for waste minimization in the Philippines should be evaluated for their true capability to promote waste minimization.

Objectives

- collect detailed information on the types of organizations offering technical assistance and the quality of assistance offered;
- determine the most appropriate organization(s) or institution(s) to provide technical assistance to Philippine industry in waste minimization.

General Tasks and Schedule

Selection

1 month

- Select an expert from a U.S. State Office of Technical Assistance (OTA) or State Pollution Prevention Officer to assist in conducting the capabilities assessment. Also identify several Filipino business volunteers to conduct the assessment through actual requests for technical assistance.

Identify Organizations to be Evaluated

1-2 weeks

- US State OTA expert travels to Manila to review materials and visit suggested OTA-like organizations (ITDI, DAP, VOICE, business NGOs, etc.) State OTA experts to work with selected Filipino business persons to determine their needs and past experiences. Personally interview technical assistant organizations and businesses which have been helped by the technical assistance organization in the past.

Prepare Criteria

- US State OTA expert works with DENR/EMB and business volunteers to develop criteria for technical assistance organization.

Conduct Capabilities Assessment

1-3 months

- Filipino business volunteers conduct a survey of available technical assistance through actual requests for assistance from reported technical assistance organizations. By approaching the question of capability in the shoes of a business person looking for help, the reality of the situation is much more likely to be identified. Since assistance may be slow in coming, a relatively long-term commitment to monitoring the project would be needed.

Prepare Report

2-3 weeks

- State OTA expert submit a report on the capability assessment findings, including recommendations on most appropriate technical assistance organization. Report on the results of personal interviews with organizations and businesses seeking assistance.
- Business volunteers report on technical assistance organizations responsiveness, quality of assistance, lack of assistance etc. Make recommendations for formalized TA organization.

6.3. OFFICE OF TECHNICAL ASSISTANCE PILOT PROJECT*

Introduction An Office of Technical Assistance (OTA) pilot project should be initiated to promote toxic use reduction and waste minimization to companies of all sizes, focusing on small and medium businesses where feasible. The pilot project should focus predominantly on waste minimization and leave other topics such as permitting, treatment and environmental impacts statements in the hands of the consulting community. These services are available for a fee from the private sector. Government can devote scarce resources to waste minimization needs which are not serviced by the private sector.

Objectives

- to demonstrate waste minimization as the economically and environmentally preferred method of environmental protection via a three year pilot project;
- to gain trust from industry to work with a government non-regulatory agency;
- to develop political support for funding larger waste minimization projects and programs at the national and provincial level.

General Tasks and Schedule

Recruit and Train Staff

0-6 months

- For a waste minimization technical assistance project, the host institution must employ engineers, preferably with industry experience and individuals with strong pollution control, economic and business backgrounds.

Establish Industry Advisory Committee

0-36 months

- To include the business community in the project, an industrial advisory committee should be established; a liaison to the local Chamber of Commerce, trade associations and other business organizations should be established. This committee will assist in developing and monitoring the pilot project and in dissemination of the results.

Identify Target Industries and Geographic Area

1-6 months

- Industries should be targeted according to the following criteria: potential impact on human health and the environment, geographic concentration, and opportunities for waste minimization techniques and technologies. Waste minimization literature on target industries should be procured.
- Two possible industries are metal finishing and agribusiness. There are proven, low-cost, low-tech waste minimization techniques for both industries.

Outreach and Coordination

3-36 months

- A good line of communication should be established with the regulatory agency as well as a policy of confidentiality. In addition a policy of handling out-of-compliance firms should be developed.
- A series of seminars should be run jointly with an umbrella business organization such as the Chamber of Commerce. Six to eight seminars should be held annually.

Conduct Waste Minimization Audits**6-36 months**

- Identify appropriate technologies and practices to be demonstrated

Conduct Demonstrations**6-36 months**

- Evaluate demonstrations based on costs, impacts on productivity and environmental impact.
- Identify, document and promote examples of waste minimization success stories.

Reporting Requirements

- Semi-annual progress reports should be required and a final report at the project's conclusion.

* For a complete discussion of this pilot project proposal, please see Tim Greiner's report: *Prevention of Industrial Pollution in the Philippines: A Waste Minimization Institutional Assessment*

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6.4. ADDITIONAL WASTE MINIMIZATION TRAINING

Introduction Training in waste minimization assessment procedures, program development and implementation, and total quality environmental management should be provided. Training needs to be made highly participatory using principles of group discussion, team problem solving, and field exercises. The classes should be taught by people who have done actual site visits themselves and can discuss the basic issues as well as personnel and sociological issues involved in waste minimization. Training should be provided on a regional basis. An excellent start would be establishing/implementing a training sequence in each of the DENR's 14 regions. The training should be attended by DENR inspectors and officials, local NGOs and economic development authorities. It must be re-emphasized that waste minimization training is not very complicated, but it must be delivered with enthusiasm and vision as a new way of improving both profits and the environment.

Objectives

- introduce the concept of waste minimization and identify the economic and environmental benefits of such a management approach to regional inspectors and other government officials, regional industries, NGOs and economic development authorities;
- inform regional representatives of Philippine waste minimization success stories;
- train regional representatives to conduct waste minimization audits and to prepare waste minimization industrial facility plans;
- train Philippines officials to conduct future training courses.

General Tasks and Schedule

Selection of U.S. Workshop Leader and Instructor and Filipino Instructors and Workshop Coordinator

1 month

- Select two U.S. waste minimization experts to lead and instruct the initial four workshops and a Filipino workshop coordinator. Also select two Filipino instructors with experience in waste minimization and conducting PMAs to observe and alternatively instruct specific sessions of the initial four workshops.

Establish a Training Sequence of DENR's 14 Regions

1 month

- DENR/EMB work with regional offices to develop a prioritized sequence of training workshops for the regions. Regions could be blocked in groups of 3-4. Establish a time frame for conducting 3-4, four day training workshops sequentially.

Workshop Design

1-2 months

- DENR/EMB, workshop coordinator, U.S and Filipino instructors design workshop based on previous waste minimization workshop and consistent with IEMP terminology and techniques. Determine venues and timing. Workshop instructors develop course material. DENR/EMB and workshop coordinator identify industries and specific factories for audits. Workshops should include a general overview of waste minimization (definition, benefits, presentation of success stories, development of a corporate strategy); instruction on conducting a waste minimization audit; how to implement options developed from audits; field visits to conduct audits; a report on audits and findings; and discussion of future action plans between industry and government.

Pre-workshop Preparation

1 week

• US and Filipino instructors spend one week in Philippines (Manila) prior to first workshop to finalize all preparations for the workshop and to become familiar with environmental management standards and regulations (such as RA 6969); meet with officials from government, industry and other organizations.

Workshops Proper

3-4 weeks

US instructors conduct 3-4, four day workshops in different regions. Filipino instructors observe and alternatively assist in instructing workshops so that they may lead the next series of workshops.

Post-Workshop

2-3 weeks

Instructors and workshop coordinators submit report on workshops, including findings and suggestions for improvement to next round of workshop. U.S. workshop instructors provide an evaluation and endorsement of Filipino instructors to lead future workshops.

6.5. REGIONAL WASTE MINIMIZATION PILOT PROJECTS

Introduction A pilot waste minimization project should be implemented in each DENR region under the supervision of the Regional Technical Director. The project should be linked to compliance and certification to give all parties practice in institutionalizing the mechanisms for achieving waste minimization. The ideal recommended project would focus on a priority facility with good waste minimization potential. A year should be given to complete the plan, and support for planning should be provided to each facility from the IEMP PMA team. The PMA team should only teach and suggest; the facility has to come up with the answers on their own for the concepts to be truly internalized. A key focus of the PMA team should be on current and alternative costs so that at the end of the project, the facility is motivated to implement waste minimization actions in the interest of potential cost savings. The project should be well documented to ensure that quality success stories can be written at the end. High recognition should be given to facility managers throughout the pilot project to keep them motivated and concerned about their success.

Objectives

- provide hands-on practice in achieving waste minimization;
- provide documentation of the economic and environmental benefits of waste minimization;
- provide recognition and publicity for successful environmentally concerned companies.

Regional Technical Directors Identify Companies for Pilot Project **1-2 months**

- RTDs identify companies in their regions for pilot waste minimization projects which have a high chance of success.

Prepare Action Plan **1-12 months**

- IEMP PMA teams works with selected companies to prepare a thorough waste minimization action plan. Emphasis on documentation of cost savings. Company implements plan.

Conduct Demonstration **12-18 months**

- Company implements plan.

Documentation of Pilot Project **12-24 months**

- Company representatives, RTD and PMA thoroughly document project. Emphasis should be on documentation of cost savings. Prepare detailed user-friendly case study for distribution.

Dissemination of Results

APPENDIX A

CONSULTATIVE FORUM ON THE IMPLEMENTATION OF REPUBLIC ACT 6969

The Consultative Forum on the Implementation of Republic Act 6969 was the first in the series of three hazardous waste management workshops organized by the DENR/EMB and WEC and sponsored by USAID/Philippines under its Technical Resources Project. The Consultative Forum was held at the Manila Pavilion June 17-19, 1992. The 100 participants who attended the forum came from varied disciplines and organizations, and included 17 top level industry officials, 37 government officials and employees, 21 industrial sector representatives, 11 representatives from the NGO community, 9 representatives from academia and 4 representatives from consultancy groups.

In preparation of the Consultative Forum, a series of roundtable meetings were held separately with representatives from industry, NGOs and academia, and government on May 25, 27, 29, 1992 respectively. Issue papers were prepared for the Consultative Forum based on the discussions at the roundtable meetings. The views expressed by the sectoral representatives during these meetings were consistent with the views expressed by the majority during the Consultative Forum proper.

Objectives

The objectives of the Consultative Forum were:

- to provide an opportunity for key leaders of the private sector, the NGO community and the government agencies concerned to comment on the Implementing Rules and Regulations (IRR) of RA 6969;
- to develop strategies and support for sound hazardous waste management in the Philippines; and
- to establish a network of contacts and resources that extend assistance to DENR in the effective implementation of RA 6969.

Overview of Forum

The first day of the forum featured a comprehensive presentation on RA 6969 and its implementing rules and regulations, including viewpoints from NGOs and industry. An overview of hazardous waste management, technologies and their applicability to the Philippines was also presented. In addition, the U.S experience with hazardous waste regulations was discussed, including a session on USEPA Hazardous Waste Site Clean-up Efforts.

On the second day the mining and semiconductor industries concerns were presented as well as the role of NGOs in implementing RA 6969. These sessions were followed by a break-out workshop session.

The final day focused on the research and testing capabilities of DENR/EMB in support of RA 6969 and techniques for the chemical transformation of hazardous wastes into useful products. An open forum session was followed by three workshop sessions.

Conclusions

- RA 6969 is costly on industry and consumers;
- governmental budgetary constraints impede the full enforcement and implementation of RA 6969;
- responsibility for enforcement of RA 6969 lies with EMB; unfortunately, this responsibility was handed over without the benefit of transition measures such as increasing the number of highly specialized technical staff in the Chemical and Waste Management Section, upgrading of the laboratory facilities and providing adequate hands-on training of the laboratory staff;
- industry cannot divulge the results of their continuing research on product development and process and raw material compositions without an assurance of confidentiality on the part of the government;
- implementation of market incentives for industry pollution control measures lacks coordination among government agencies;
- the time frame of 180 days stated in the IRR is not practical, workable, or fair as it relates to industry productivity and competition;
- the industrial sector should be represented on the Technical Advisory Council

Recommendations

1. DENR should strongly and officially endorse the Steering Committee created during the Forum. This committee, compelled by the desire to voluntarily serve the DENR, should be recognized as a working partner of the government.
2. Full implementation of RA 6969 should be deferred until a viable plan of action is drawn up by the DENR. Interim measures, such as the provision of full support to the proposed Steering Committee should be undertaken before the program can be fully implemented. Activities such as data gathering, can be facilitated through this Committee since most of the members are major users, manufactures, importers, handlers and suppliers of toxic and hazardous substances.
3. In accordance with RA 6969, fines collected and administered by the DENR should be devoted to projects and research activities relative to toxic and hazardous waste management. DENR should formulate research designs to their needs, and sub-contract the implementation of the projects to deserving and highly credible management and consulting offices.
4. The IRR should specifically include a provision on how reports, records, or information submitted by industry will be treated. The persons to whom these documents are entrusted should be of high moral conduct and must possess an unquestionable record of honesty in the entirety of their professional service record. The information under their

care can adversely affect the competitive position of aggrieved parties. Accessibility of submitted information to the general public might cause unnecessary risks. It would be beneficial to industry if all information submitted is treated with extreme confidentiality and is not publicly accessible.

5. The Industrial Waste Exchange Program of EMB should be strengthened, and available data from EMB's data bank should be harnessed to the maximum.
6. The government should maintain close liaisons with the NGO community, academia and the industrial sector, before embarking on revisions or creation of new legislation. This will afford a more judicial and harmonious review of said policies and programs by all concerned groups.
7. Resource speakers from developing countries in the Asia region should participate in forthcoming workshops due to the likelihood that they will have a better understanding of the economic and cultural issues and constraints facing the Philippines.

(For a more detailed description of this forum, please see the final report: Report on the Consultative Forum in the Implementation of RA 6969, submitted to USAID/Philippines March 1993)

APPENDIX B

NATIONAL WORKSHOP ON METHODS FOR HAZARDOUS WASTE INVENTORY

The National Workshop on Methods for Hazardous Waste Inventory was the second in the series of three hazardous waste management workshops organized by the DENR/EMB and WEC and sponsored by USAID/Philippines under its Technical Resources Project. The East-West Center, through the Pacific Basin Consortium for Hazardous Waste Research (PBCHWR) was responsible for the implementation of the workshop in coordination with the DENR/EMB. The Hazardous Waste Inventory Workshop was held in Tagaytay City, September 21-25, 1992. Enforcement officers from the DENR and Laguna Lake Development Authority and engineers and technical personnel in charge of pollution control for industries responsible for generating hazardous waste participated in the five-day workshop.

Objectives

The objectives of the Hazardous Waste Inventory Workshop were:

- to provide information on waste inventory methodologies;
- to set the waste inventory within the wider context of hazardous waste management;
- to provide information on the implementation of RA 6969;
- to develop a waste inventory methodology which is valid and accounts for local customs and practices;
- to test the derived waste inventory methodology in case studies and actual practice; and
- to provide feedback to the Environmental Management Bureau on the implementation of RA 6969.

Overview of Workshop

The workshop was divided into three sections. The first section: *General Overview of Hazardous Wastes*, was held on Monday afternoon and Tuesday morning. It included a series of lectures on the definition, legislation, treatment, disposal and management of toxic and hazardous wastes; a discussion of RA 6969 lead by EMB; and a profile of industry in the Philippines.

The second section: *Prioritization and Reporting of Hazardous Wastes*, was carried out on Tuesday afternoon, Wednesday and Thursday morning. Delegates were divided into five groups and worked to provide an analysis of current RA 6969 information. The delegates reported back as groups to the workshop on their conclusions. In addition, the groups addressed three major issues: prioritization of hazardous waste in the Philippines; philosophy for the waste inventory and auditing; and details on hazardous waste registration. For each topic general guidelines were given along with a brief explanation of the provided resource materials.

The third section: *Site Visit and Case Studies*, took place on Thursday afternoon and Friday. On Thursday, a site visit was arranged to a hospital waste incinerator and the site of a hazardous waste/chemical fixation facility. On Friday, delegates worked in groups on two case

studies/waste inventory exercises. First, participants were provided the statistics of the Philippine manufacturing and chemical sectors and then asked to use the rapid assessment methodologies to estimate the likely waste generated. Second, a description and preliminary audit of an electroplating and metal fabrication factory was provided and delegates attempted to estimate the hazardous waste generated as per current RA 6969 interpretation.

Conclusions

The conclusions were presented to the workshop at the conclusion of each section and have been modified to account for comments received.

Section 1: A General Overview of Hazardous Wastes:

- There is no regional or national inventory of hazardous wastes. An inventory is required for the development of: government policy, EMB strategies for hazardous waste management, planning of hazardous waste storage treatment and disposal facilities, and an integration of waste management within wider management issues.
- The inventory itself is only a supporting part of overall waste management. The long term preferred approach to waste management has to be waste minimization, with treatment and disposal only to be used for waste for which source reduction, reuse, and recovery are not possible.
- The cost of hazardous waste management in the Philippines will depend upon the chemical properties and volume of the waste.
- The clean up of contaminated sites is significantly more expensive than proper waste management at the time of generation.
- The chemical manufacturing sector in the Philippines is relatively small. However, the Philippines is a major importer of chemicals. High import duties have restricted the use of some chemicals.

Section 2: Priorities in the Philippines

- The priority waste groups as identified by the delegates are: metal finishing wastes, organic solvents, and acids and alkalis.
- Wastes considered by the delegates to be of little consequence for the Philippines included: reactive wastes, waste containers, putrescible wastes, and oily organic wastes.
- The delegates also concluded that little waste is generated from the pesticide, pharmaceutical and textile industries. (However, in view of the importance of textile exportation, it was agreed that waste generation from the textile industry requires independent checking.)
- A procedure to classify waste sludges from the metal finishing industry and a disposal site for immobilized wastes is needed.

- Efforts should concentrate on the largest generators of hazardous wastes with some consideration of toxicity.
- Chemicals and wastes subject to international agreements or treaties to which the Philippines is a signatory should be included as a high priority in any listing.
- The Rapid Assessment Methodology can only be used as a general guideline for estimating hazardous waste generation. The methodology appears to overestimate the volumes of waste generated. Discussions should be held with the relevant organizations to investigate redelimitation of the classifications.

Section 3: Site Visits and Case Studies

- Larger industries and multinational companies have already carried out audits of their sites and hence it should be relatively straightforward to obtain detailed information on certain targeted large industries. For small industries, non-government organizations representing the industry group may be a good source.
- There are probably only a limited number of medium sized industries which generate significant amounts of hazardous wastes. These are mainly in three geographic areas (Cebu, Manila, Laguna Lake). These industries could be prioritized, staff trained to conduct audits and specific audits carried out.

Recommendations

The following recommendations should be considered by EMB in any revisions of the implementation of RA 6969.

1. There should be some simplification and prioritization of the listing of wastes in RA 6969.
2. There should be a clearer delineation of water pollution and hazardous waste management issues. Currently, there is some confusion of the intent and detail of RA 6969 which should be targeted towards the management of residues.
3. A disposal site is urgently needed for metal containing sludges. The approval system should be facilitated to fast track the operation of a suitable secure landfill site.
4. A leachate testing apparatus such as recommended by the USEPA should be developed to test all stored sludges to ascertain their suitability for landfill disposal.
5. The chemical registration form should be revised and made more user friendly.
6. EMB should provide briefing sessions for Pollution Control Officers and for relevant persons in the regions.
7. A follow-up workshop should be held to report on progress towards the national waste inventory and registration under RA 6969.

*(For a complete description of this workshop, please see the draft report: **A Report on the National Workshop on Methods for Hazardous Waste Inventory**, submitted to USAID/Philippines by Mr. Dave Barnes, principal consultant to the Pacific Basin Consortium on Hazardous Waste Research, in November 1992. Please note that this report is currently under revision and should be completed by July 1993.)*

APPENDIX C

A WORKSHOP ON WASTE MINIMIZATION: AN EMERGING CORPORATE STRATEGY

The Workshop, "Waste Minimization: An Emerging Corporate Strategy", was the last in the series of hazardous waste management workshops organized by the World Environment Center and DENR/EMB with support from USAID/Philippines under its Technical Resources Project. The workshop was held in Makati, Metro Manila from January 18-22, 1993, and was geared towards fostering cooperation and understanding among industry and government on waste minimization opportunities.

Objectives

While the original objective of the workshop was to introduce the concept of waste minimization and to identify the economic and environmental benefits of such a management approach, the workshop went beyond that goal and actually transferred waste minimization technology and assistance to private industry and helped develop the capabilities of government staff to extend technical assistance.

Overview of Workshop

Two parallel programs were developed -- one for the private sector (5 days) and one for government (3 days), with a joint session on the last day. The first day of the five-day workshop brought together a group of approximately 100 industry and government representatives for a general discussion of waste minimization. In addition, three Philippine business people presented environmental success stories from their companies. The stories demonstrated both organizational and technical approaches to waste minimization. U.S. case studies were used to illustrate various ways to succeed in waste minimization, from purchasing and inventory control to chemical substitution and waste segregation.

The subsequent three days provided more intensive training in the methodologies of waste minimization audits and visits to government and industry separately. Industry participation was limited to a more manageable size of 20, coming from the agro-processing, chemical, electroplating and semi-conductor sectors. The number of participants from the government sector was likewise limited to 20 representatives from the government agencies involved in urban and industrial environmental management -- the Regional Offices of the DENR, the Laguna Lake Development Authority, the Metro Manila Authority, the Department of Trade and Industry, the Department of Science and Technology, the Development Academy of the Philippines and the Metropolitan Waste works and Sewerage System.

The industry group split into three teams and visited three companies: Mobil Philippines, Inc. (asphalt), Chemphil, Inc. (chemicals), and Fastbrite, Inc. (electroplating). Their tasks was to evaluate the waste-producing processes at the facilities, apply the waste minimization methodology from their training, identify opportunities for waste minimization and present a report to the host facility and assembled workshop participants. The teams applied many of the procedures they had learned in the previous two days, and each team was able to identify several cost-saving opportunities for the host companies.

The government group engaged in team discussions on ways to promote waste minimization within their existing authority. A draft collection of short success stories was obtained from Industrial Environmental Management Project (IEMP) and used in discussion with the government group. Each study was read and the group was asked to determine what kind of waste minimization method was used, if any. (Several studies were actually waste treatment stories.)

The workshop culminated in a final day of discussions and presentation with industry and government together. Industry groups presented site visit reports to the government group and each other, and then groups were mixed into teams for discussion of further steps to promote waste minimization.

Conclusions

The workshop was successful. Group participation and discussion was very active. Industry teams successfully applied training on site visits to industrial facilities and reported that the training was very useful. Government representatives agreed they could work with industry to promote waste minimization. Industry and government participants worked together to recommend action steps to create a "win-win" future for waste minimization in the Philippines and a committee was formed to promote waste minimization nationally.

Specifically, it was found that:

- waste minimization is readily understood as a concept by Philippine industry and government;
- waste minimization training is effective as practiced in the workshop;
- there are numerous resources available to promote and institutionalize waste minimization;
- waste minimization problems in the Philippines are dominated by high Biological Oxygen Demand (BOD) wastewater concerns and water conservation and reclamation should be a major focus of future work;
- most progress in waste minimization will be made by transferring waste minimization knowledge, not technology;
- the technologies most important for waste minimization include, sensors, automation, information systems and recycling systems such as solvent distillers and wastewater reclamation;
- the government has existing authority to require waste minimization planning from industry using various existing regulatory mechanisms; and
- workshop participants could agree on priority action steps to make waste minimization a reality in the Philippines.

Recommendations

There is a lot of room to carry out waste minimization in the Philippines. While waste minimization can be "forced" on the private sector through the use of government's regulatory powers, government should encourage companies to adopt waste minimization and provide incentives to do so. Institutionally, the government agencies in charge of environmental management and protection are in a good position to promote waste minimization as a new strategy to address industrial pollution. The DENR Regional Technical Directors (RTD) for Environment committed to actually convince at least one of the top polluting firms in their respective regions to adopt waste minimization measures in addition to end-of-the-pipe treatment within the next 6 months. However, their capability to extend technical assistance to industry must be strengthened. While the RTDs have promised to echo this workshop to their environmental sector staff (especially inspectors), further training is needed to really equip them to carry this out effectively.

Specifically, the following recommendations were made:

1. Workshop results should be acted upon, particularly in establishing a waste minimization oversight committee.
2. An official functional definition of waste minimization that includes source reduction and recycling should be established.
3. Waste minimization should be established as a formal government policy in both environmental management and in economic development.
4. A capability assessment of Philippine institutions, including business, public NGO's, academia, and government agencies should be conducted to determine how to best promote waste minimization in the long term.
5. The Pollution Control Association of the Philippines (PCAPI) should be utilized to provide technical assistance to firms across the country.
6. The function of pollution control officers (PCO) should be expanded to cover not only end-of-the-pipe measures but also waste minimization.
7. Training in waste minimization assessment procedures, program development and implementation, and total quality environmental management should be provided.
8. At least one waste minimization project which has a chance of success should be implemented in each DENR region, supervised by the RTD.
9. Waste minimization policies and projects should be linked to other government efforts such as lower and higher education, occupational safety and health, quality management for exporters and science and technology development.
10. EMB should work with one business NGO to establish a waste minimization resource center until the capability assessment determines a more permanent institution.

(For a more detailed account of this workshop, please see Mr. Burton Hamner's report: *A Workshop on Waste Minimization: An Emerging Corporate Strategy*, and Ms. Bebet Gozun's report: *Workshop on Waste Minimization*.)