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**END-OF-PROJECT  
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## **END-OF-PROJECT REPORT**

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Prepared for:

**Environmental Management Bureau**  
Department of Environment and Natural Resources  
Diliman, Quezon City, Philippines

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July 31, 1997

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- ◆ DENR Secretary The Honorable Victor O. Ramos; DENR Undersecretary for Environment and Programs Development, Dr. Delfin J. Ganapin, Jr.; EMB Assistant Director (and currently OIC Director), Ms. Amelia Dulce D. Supetran; DENR IEMP coordinator, Mr. Geri Geronimo R. Sañez; and all DENR Regional Executive Directors, Regional Technical Directors, and their staff.
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## EXECUTIVE SUMMARY

### BACKGROUND

The Department of Environment and Natural Resources (DENR) has targeted industrial pollution reduction as one of its highest priorities and the Philippine Strategy for Sustainable Development clearly states this objective. The Industrial Environmental Management Project (IEMP) is one of several initiatives undertaken by DENR to fulfill this obligation.

The goal of IEMP was to encourage sustained economic growth in the industrial sector, reduce environmental degradation, and improve public health. To achieve this goal project designers promulgated a three-part strategy to improve waste management: (1) prevent or reduce pollution at its source (waste minimization); (2) reclaim and reuse industrial wastes; and (3) encourage pollution control with new technologies.

PRC Environmental Management, Inc. (PRC EMI) was awarded the contract and began implementation of IEMP in July 1992. The original Project Activity Completion Date (PACD) was November 1, 1996, which was subsequently changed to September 30, 1996. Two no-cost project extensions were requested by DENR and approved by USAID. The first extended the PACD by 5 months to February 28, 1997; and the second by 4 months to June 30, 1997.

### OVERVIEW

One of the most important results of the project is the support given to the DENR in establishing a broad-based partnership with industry and financial institutions. This partnership is fueled on the one hand by DENR through improved compliance monitoring and enforcement, and on the other hand by promoting market-based initiatives that provide the economic incentives to industry to reduce pollution generation. Industry, for its part, has responded to DENR initiatives by reducing pollution generation through waste minimization while reaping the economic benefits of pollution reduction.

The third member in this partnership is the financial sector, particularly the Land Bank of the Philippines (LBP) and the Development Bank of the Philippines (DBP). Both institutions have formed environmental partnerships with DENR to promote and encourage environmental investments. Below market rates for loans for environmental projects that are economically feasible and can be demonstrated to be environmentally sound are now available to Philippine industry through LBP's Countryside Loan Fund II and DBP's Environmental Infrastructure Support and Credit Program (EISCP).

This partnership led by DENR is responding to the environmental concerns of the Philippines, but its full impact has yet to be measured. We can, however, measure the impact of IEMP as an important supporting player on the DENR team. This End-of-Project Report summarizes project outputs and recommend follow-on activities to DENR that will help to sustain the benefits of IEMP and strengthen the partnership with industry and financial institutions.

## KEY ACTIVITIES

The project activities categorized as project components are described below.

- ◆ **Pollution Reduction Initiative (PRI):** Identify priority polluting industrial subsectors and to assist firms to conduct pollution management appraisals resulting in the adoption of remedial measures that are environmentally and financially sound.
- ◆ **Policy Studies and Public/Private Dialogue:** Conduct key policy studies and support dialogue among affected public sector, business, and non-governmental organizations (NGO) to improve economic and environmental conditions.
- ◆ **Capability Building:** Improve technical skills for industrial environmental management activities for government, industries, environmental consulting firms, industry associations, universities, and NGOs.

While IEMP concentrated on pollution prevention activities outside Metro Manila, two similar projects provided similar services in Metro Manila, and for larger firms outside of Metro Manila. These are the Metropolitan Environmental Improvement Project (MEIP) and the ASEAN-Environmental Improvement Project (ASEAN-EIP). This arrangement proved to be highly satisfactory in preventing duplication of efforts while expanding the Philippine pollution prevention experience and database.

### Pollution Reduction Initiative

IEMP concentrated its efforts on small and medium-sized enterprises (SME) outside of Metro Manila and emphasized on waste minimization, waste recovery, and reuse. Pollution control and treatment (end-of-pipe) to a lesser extent were also included in IEMP's overall strategy. Focusing project resources on waste minimization has paid dividends beyond original expectations. Low-cost/no-cost and capital intensive investments in waste minimization by volunteer firms have improved plant operating efficiencies, produced good returns on these investments, and resulted in measurable reductions in pollution generation. The IEMP team together with IEMP subcontractors and key staff at DENR regional offices achieved the following outputs:

- ◆ Introduced the concept of waste minimization to over 400 industrial firms

- ✦ Created a market for environmental services
- ✦ Prioritized Philippine industry according to relative potential risk to public health
- ✦ Achieved a measurable reduction in industrial pollution generation nationwide
- ✦ Conducted Pollution Management Appraisal for 143 volunteer firms and published Pollution Management Guidebooks for 9 industry subsectors
- ✦ Created a waste minimization database
- ✦ Increased the national capacity for conducting PMAs by adding 36 Filipino consultants to the roster of trained waste minimization specialists

### Policy Studies and Public/Private Dialogues

The second component of IEMP was Policy Studies and Public/Private Dialogues. Six major studies were completed along with 11 public/private dialogues. IEMP-sponsored policy initiatives are now having and will continue to have a strong influence on the evolution of Philippine environmental policy development in the coming years. A brief description of the policy studies is as follows:

- ✦ **Analysis of Current Regulatory Programs for Pollution Management:** analyzed gaps and weaknesses in existing regulations and standards for air, water, and waste management as well as the ineffectiveness of the present fines and penalties system for non-compliance with standards. This policy study proposed concrete short-term (1 to 2 years) to medium-term (3 to 5 years) solutions to rectify these regulatory deficiencies.
- ✦ **Market-based Instruments to Promote Pollution Reduction in the Philippines:** identified and developed an Action Plan for implementing the following market-based mechanisms in the Philippines: financial incentives and subsidies; user fees on raw materials and water; pollution and effluent charges; user charges for central waste treatment facilities; markets for wastes; risk and liability systems; and deposit-refund systems.
- ✦ **Financial Resources to Fund Environmental Investments:** investigated the country's financial institutions and recommended ways they could be tapped to enhance private sector investments in environmentally sound technologies.
- ✦ **Standards for Characterization and Registration of Hazardous Wastes under RA 6969:** developed the standards and procedures for hazardous waste

characterization. This study led to a technical assistance project to develop an RA 6969 implementation plan.

- ◆ **Integration of Pollution Reduction Planning and Environmental Risk Assessment in the Environmental Impact Assessment Process:** proposed reforms in the Philippine EIA system with emphasis on EIA as an effective planning tool rather than a regulatory bottleneck.
- ◆ **Impact of Organization and Decentralization of Government Institutions on Pollution Prevention:** investigated how devolved environmental regulatory functions can be effectively implemented by local government units.

Action programs were developed by IEMP and adopted by DENR for air and water quality management, environmental impact assessment, enforcement of fines and penalties, phased institutional development, market-based instruments, and management of hazardous wastes and toxic chemicals.

IEMP policy initiatives and proposed action plans were presented through dialogues with public and private sector representatives to enhance public awareness and elicit feedback from all stakeholders. Dialogues focused on prominent issues and concerns including programmatic compliance, market-based instruments, social acceptability, fines and penalties, revisions to the *Philippine Environmental Code*, and the formulation of new and revised DENR Department Administrative Orders (DAO).

IEMP provided assistance in drafting four DAOs to implement policies relating to: (1) industries' participation in pollution management appraisals (DAO 17); (2) importation of materials containing hazardous substances (DAO 29); (3) EIA programmatic compliance procedures (DAO 11); and (4) improvement of EIA implementation (DAO 96-37). IEMP has also provided special technical and organizational assistance to DENR, the House Committee on Ecology, and the Senate Committee on Energy and Environment in preparing House Bill No. 4 "Revising the Philippine Environmental Code."

### Capability Building

IEMP conducted 63 national and regional training workshops attended by more than 2,500 participants from both public and private sectors. IEMP developed six training programs aimed at increasing the environmental management capacity of DENR staff, LGUs, and NGOs, and the knowledge level of industrial participants for waste minimization and pollution prevention. The expected end-of-project (EOP) outputs in terms of participants trained compared with actual participation in IEMP training programs are summarized as follows:

- ◆ **Pollution Management Appraisal:** EOP 200 - 988 participants trained representing 400 firms

- ✦ Environmental Risk Assessment: EOP 60 - 140 participants trained
- ✦ Environmental Impact Assessment: EOP 700 - 771 participants trained
- ✦ Compliance Audit: EOP 200 - 225 participants trained
- ✦ Compliance Monitoring: EOP 200 - 278 trained
- ✦ Data Collection, Sampling, and Sample Analysis: EOP 300 - 200 trained

By mid-project implementation, most training workshops were conducted by host country resource persons and facilitators without further involvement by U.S.-based consultants. By end of project over 60 Filipino professionals had been involved in all phases of IEMP implementation. They are a valuable resource for sustaining the future of environmental management in the Philippines.

#### **Project Extension Activities**

To further support DENR in its environmental management programs, IEMP was extended for 9 months until June 30, 1997. IEMP's major activities during the extension period were focussed on 4 major DENR programs: EIS system strengthening, RA 6969 implementation, PMA institutionalization; and IEC campaigns.

### **CONSTRAINTS, LIMITATIONS, AND FOLLOW UP RECOMMENDATIONS**

The following issues are brief descriptions of constraints and limitations with corresponding recommendations for follow-up action.

#### **Sustainability of Waste Minimization**

Direct measurement of sustainability is possible but may be time consuming and costly. In Section 4.0 we discuss low-cost rapid assessment methodology to measure the benefits of IEMP in the public and private sectors.

#### **Enforcement of Environmental Standards**

IEMP policy research clearly demonstrates that poor enforcement of environmental discharge standards is a major deterrent to reducing the volume and toxicity of industrial effluents and emissions. The disproportionate allocation of DENR resources to forestry management has resulted in about 3 percent of the annual budget being allocated to EMB for compliance monitoring and enforcement of industrial discharge standards. Poor enforcement may also have negatively impacted IEMP's recruitment efforts to attract volunteer firms and will continue to be an disincentive for firms

to meet compliance standards. This issue should be addressed by USAID and DENR in the design of the IEMP follow-on project.

### Improvement of Compliance Testing

Regional environmental laboratories are poorly equipped to handle the increasingly heavy burden of compliance testing. IEMP invested significant resources in training regional laboratory and field technicians to take and analyze effluent sample for compliance with discharge standards. A three-pronged approach discussed by IEMP and EMB to improve compliance testing includes: (1) upgrading of regional laboratories; (2) creating a market for private sector compliance testing through improved enforcement of standards; and (3) promoting self-monitoring program for industries.

### Institutionalization of PMA as a Regulatory Requirement

The value of waste minimization and the PMA process has been clearly demonstrated by IEMP, and DENR has established PMA as a Key Result Area (KRA) for regional offices. PMA as an environmental management tool is presently required under RA 6969 and DAO 11 (Programmatic Compliance). The Pollution Adjudication Board (PAB) requires a PMA as a conditionality for a Temporary Lifting Orders (TLO), and PMAs may be required in the EIA environmental management plan. Additional training of regional Environmental Quality Division (EQD) technical staff to review PMA plans, monitor implementation, and manage and maintain a compliance monitoring database may likewise be required. DENR should establish clear implementing guidelines for institutionalizing PMA as a KRA.

### Expansion of the Limits of DAO 17

The 1-year moratorium protection from cease and desist orders (CDO) provided under DAO 17 helped to attract volunteer firms to IEMP's waste minimization program. DAO 17 applies only to IEMP and has ended after IEMP unless DENR takes action to extend the moratorium to all firms that voluntarily adopt and implement the PMA process. Management of the expanded program will require additional training of regional EQD personnel as noted above.

### Implementation of a Pollution Charge System

IEMP provided assistance to the Laguna Lake Development Authority (LLDA) to pilot test a load-based pollution charge system (now called user fees system). This is a first step toward a national pollution charge system. The technical, legal, and policy-support elements of implementation have been worked out and adopted by the LLDA board of directors. DENR is closely monitoring implementation of the program but should now begin to prepare the legal framework needed for a national pollution charge system.

### Strengthen Information, Communication, and Education

Two of DENR's major programs, the EIS system strengthening and the RA 6969 implementation, have started an active information, education and communication (IEC) campaign through IEMP's assistance. There are other IEC materials and projects that need to be developed to support these 2 programs as identified by IEMP. DENR should consider continuing an active and well-managed IEC program through the support of other projects like the present Coastal Resource Management Project (CRMP).

IEMP's role as a catalyst in moving government, industry, and other stakeholders towards improving environmental management cannot be underestimated. For 5 years, IEMP tried to influence industries into undertaking waste minimization as a necessary step before considering end-of-pipe solutions. Many industries were able to prove that waste minimization can mean additional benefits with significant pollution reduction. At the firm level for those which received direct assistance, IEMP believes sustainability has been established. However, much is to be done at the national level. The partnership among DENR, industry, and financial institutions need to be continued, supported, and strengthened through extended unanimity among these key players of environmental management.

## 1.0 INTRODUCTION

This document serves as the End-of-Project report for the Industrial Environmental Management Project (IEMP), a joint project of the United States Agency for International Development (USAID) and the Philippine Department of Environment and Natural Resources (DENR). The project was implemented by PRC Environmental Management, Inc. (PRC EMI) between July 9, 1992, and September 30, 1996. Two no-cost extensions requested by DENR were approved by USAID, which extended the project completion date to June 30, 1997.

This report summarizes project inputs, outputs, and accomplishments during the life of the project.

### 1.1 BACKGROUND

USAID Manila Mission's overall country goal, stated in the 1990 Philippine Assistance Strategy Statement (PASS), is "the promotion of broad-based sustainable economic growth through the active partnership of the private and public sectors in fostering open and efficient markets and an open society." Seven years later, this basic policy has not changed, but the initiatives for achieving this goal have evolved.



During the development of the 1990 Natural Resources Management Program (NRMP), USAID determined that a companion industrial environmental management activity was a priority for achieving its natural resource management objectives. Thus, funding for this new activity, the Industrial Environmental Management Project (IEMP) was included as part of NRMP.

USAID's emphasis on sustainable natural resources management is consistent with the agency's mission statement and development strategy for the (then) newly created Asia Bureau. Among USAID's six guiding principles for program development and implementation is "responsible environmental policies and prudent management of natural resources."

The IEMP Project Paper (PP) was published in September 1991 with the stated goal to "encourage sustained economic growth in the industrial sector, with corresponding improvements in health status." The purpose of the project was to improve industrial management of pollution through a three-part strategy in order to accomplish the following:

- ◆ Prevent or reduce pollution at its sources
- ◆ Reclaim industrial wastes that are technically and financially feasible

- ✦ Encourage cost-effective pollution abatement technologies for pollutants that need treatment

Since 1991, the pace of the Philippine's annual economic growth has increased to over 7 percent with projections for 1997 as high as 8 percent. The Philippines' growth as an emerging economy is now, or is close to being, at par with other Southeast Asian economies.

Philippine industry responding to government economic policy is driving this growth. The attendant problems of industrial and domestic pollution have, if anything, increased since the project started implementation in 1992. It is increasingly apparent that industrial and domestic pollution is creating a serious impact on coastal resources, particularly fisheries. Recently, the Government of the Philippines (GOP) has begun to evaluate the impact of pollution on public health and on renewable resources, such as fisheries.



Government recognizes that industrial environmental management must be improved to protect the expanding population and its growing economy. Through the DENR and its Environmental Management Bureau (EMB), the government places pollution prevention through waste minimization as a high priority strategy. IEMP and other "brown sector" projects are evidence of the government's commitment to improve environmental management and enforce compliance with discharge standards.

EMB's budget has increased more than 3-folds since 1993 to address growing environmental concerns and upgrade environmental analytical and monitoring capabilities. Poor enforcement of environmental regulations was and remains a disincentive for industry to meet compliance standards. But there are new initiatives being planned and implemented to improve enforcement, many of which have been products of IEMP. These and other initiatives will be discussed throughout the body of this report.

## 1.2 PROJECT RATIONALE

The goal of Philippines 2000 is to achieve sustainable economic growth, reduce environmental degradation, and improve public health. The government policy for industrial environmental management was stated in the 1989 Philippine Strategy for Sustainable Development (PSSD), which recognized the need for active involvement of the private sector and private citizens in pollution control and environmental monitoring, and the improvement of pollution control laws. DENR is committed to expanding its role in partnership with industry to encourage a stronger commitment to environmental management by sponsoring initiatives that offer training in waste minimization and pollution prevention for industries, industry associations, and other professional organizations.

IEMP was designed to assist DENR in strengthening its institutional capacity for pollution prevention policy formulation, implementation, monitoring, and evaluation. Strategies to help meet this objective included training to increase the institutional capacity for environmental management; encourage industry participation in policy development and implementation; prioritize the most pollutive industry subsectors through environmental risk assessment; and encourage market-based reform of environmental regulations by analyzing national policies.

A major design assumption was that private firms would voluntarily join IEMP for training and for pollution management appraisals once they became aware of the potential benefits from waste minimization and cleaner technology. To encourage voluntary participation the PP called for the implementation contractor to focus on technical and management approaches to waste minimization to achieve the following benefits:

- ◆ Assist industries to generate cost savings through the efficient use of energy or materials
- ◆ Generate market demand for environmental goods and services
- ◆ Transform certain types of industrial waste into usable by-products
- ◆ Justify environmental investments by firms to improve public image
- ◆ Avoid pollution-related risk to worker health and safety, and legal and regulatory battles over non-compliance

### 1.3 USAID PROGRAM STRATEGY



The USAID/Manila Mission Strategic Objective 4 (SO4), Enhanced Management of Renewable Natural Resources, is the first strategic objective for which USAID and the GOP has signed a SO4 consolidated USAID mission activities in three results packages: coastal resource management, forestry resources management, and industrial environmental management. Table 1-1 is a summary of Results Package 3 (RP3) objectives for industrial pollution abatement along with the indicators to measure progress.

The IEMP Project Design Summary Logical Framework (Appendix A) identifies impact indicators and means of verification.

**OBJECTIVE:**

Pollution abatement technology packages promoted in 25% of Philippine industries resulting to a 20% reduction in pollution discharges in participating facilities

**INDICATORS:**

- ◆ Percent reduction in pollution discharge of participating firms in industrial and municipal locations: 10% (1994) to 30% (2000)
- ◆ Number of companies conducting pollution management appraisals (PMAs) and adopting recommendations on sound environmental practices: 50% (1994) to 70% (2000)
- ◆ Increased investments by industries: 0 (1994) to \$11.0 million (2000)

## 1.4 IMPLEMENTATION CONTRACT

In July 1992, USAID awarded a cost plus fixed fee contract to PRC EMI to provide professional and technical services to implement the IEMP. The term of the contract was originally 42 months ending September 1996, but was subsequently extended for 5 months to February 28, 1997, and for an additional 4 months to June 30, 1997. Both were no-cost extensions requested by DENR.

TABLE 1-1. USAID RESULTS PACKAGE 3

## 1.5 END-OF-PROJECT REPORT STRUCTURE

This End-of-Project report is presented in 6 sections and 12 appendixes. Section 1 provides a background of the project; Section 2 discusses PRC EMI management responsibilities; Section 3 reviews PRC EMI's approach to implementation; Section 4 discusses activities and outputs; Section 5 discusses the recommended impact indicators; and Section 6 covers lessons learned and recommendations for follow on activities.

## 2.0 CONTRACT ADMINISTRATION AND MANAGEMENT ACTIVITIES

This section of the End-of-Project report presents a summary of the main activities of PRC EMI to mobilize the IEMP implementation team, establish a project office, and recruit staff.

Project implementation started on July 9, 1992, the effective date of the PRC EMI contract. The estimated project completion date was November 30, 1996, however, the completion date was later revised to September 30, 1996. In July 1996, USAID approved a 5 month no-cost extension to February 28, 1997, to implement several special activities requested by DENR. A second no-cost extension for 4 months to June 30, 1997, was also approved to continue to provide assistance to DENR.

### 2.1 MOBILIZATION

PRC EMI signed the IEMP implementation contract on July 9, 1992. Mr. Paul Y. Shimada, PRC EMI's designated Chief of Party (COP), was in Manila on the date of contract signing and immediately mobilized the implementation team. During this period Mr. Shimada worked closely with the USAID Project Manager, Mr. Jose Marcial K. Ochoa, the USAID Project Officer, Dr. Kevin A. Rushing, and the EMB Director, Mr. Rodrigo U. Fuentes to identify and implement mobilization activities. During the first project quarter, the following activities were initiated:

- ◆ Established the first project office
- ◆ Conducted initial IEMP staff recruitment
- ◆ Prepared the first project Annual Plan of Work (APW)
- ◆ Entered into subcontracts with local and U.S.-based subcontractors
- ◆ Conducted pre-implementation workshop for subcontractors, USAID, and DENR

The IEMP project office was changed several times over the life of the project to respond to a fast-phased project implementation and for an accessible office to both EMB and USAID. The first project office was established at 76-A Rosa Alvero Street, Loyola Heights, Quezon City, Metro Manila, which was occupied until mid-November 1992. After which a temporary office was established in the Sulo Hotel before moving to a permanent office at 23-A Maalindog Street, U.P. Village, Diliman, Quezon City, also close to DENR and EMB.

The final office relocation took place in mid-July 1993 when IEMP moved to its present location in the JMT Corporate Condominium building on ADB Avenue, Pasig. The new office provided work space for up to 40 IEMP staff with two conference rooms, seven telephone lines, standby power generation, and access to major streets, hotels and other business centers. At this time, Manila was suffering from extended brown-outs of up to 12 hours per day. The standby power generation capability and additional telephone lines in this growing business area improved PRC EMI's administrative flexibility and provided working and meeting space for IEMP's subcontractors. The new location was also convenient to IEMP subcontractors and within easy access of DENR, EMB, and USAID.

## 2.2 PROJECT MANAGEMENT

Two key personnel were identified in the PRC EMI contract: the COP, Mr. Paul Shimada; and the Training Coordinator (TC), Ms. Mendeluz Bautista. Ms. Bautista remained with IEMP until mid-November 1992 when she left for personal reasons.

In April 1993, EMB identified a number of project management issues and concerns leading to a request that Mr. Shimada be replaced as COP. Chief among these were lack of a suitable candidate to replace Ms. Bautista as TC; too much reliance on expatriate consultants; failure to develop local training capacity by using local consultants; the minimal impact of IEMP as perceived by EMB after 9 months of implementation; and the failure of the COP to respond to these and other issues.

After extensive discussions with EMB and USAID, PRC EMI reorganized project management structure and administration. PRC EMI replaced Mr. Shimada with Dr. Firouz Rooyani as interim COP for a period of 45 days. Dr. Rooyani reorganized the PRC EMI project team and addressed the issues raised by EMB and USAID.

On July 1, 1993, DENR and USAID approved Mr. David Wadsworth as IEMP's new COP. Mr. Wadsworth worked directly with Dr. Rooyani during the interim period to ensure a smooth hand over of responsibilities. During this time, PRC EMI developed a multistage strategy to effectively address and remediate the following critical issues voiced by EMB and USAID:

- ◆ Establishment of a closer working relationship with EMB
- ◆ Revision of the 1992-1993 Annual Plan of Work to address specific concerns on project implementation methodology
- ◆ Replacement of TC position with Technical Operations Manager
- ◆ Development of training capacity of local consultants to reduce reliance on expatriate consultants

- ← Revision of IEMP organization structure
- ✦ Improvement of financial reporting system to USAID

## 2.3 STAFF RECRUITMENT AND ORGANIZATIONAL STRUCTURE

In the project's early mobilization phase, administration and short-term staffing services were subcontracted to a local personnel and management firm, J. V. Arambulo & Associates. This firm was terminated as an IEMP subcontractor in mid-November 1992, when PRC EMI undertook to provide its own staff recruitment, logistical, and administrative services.

The core project team was reorganized in 1993, as part of PRC EMI's approach to improve project implementation. IEMP's core project staff composition is shown in Table 2-1.

POSITION	NUMBER
Chief of Party	1
Technical Operations Manager	1
Financial Controller	1
Financial Analyst	1
Information and Publication Officer	1
Component Coordinator (technical)	3
Senior Research Assistants (technical)	3
Research Assistants (technical)	8
Accounting Supervisor	1
Accountant	2
Personnel Supervisor	1
General Services Supervisor	1
Computer Technician/Programmer	1
Computer Graphic Artist	1
Receptionist	1
Encoder/Word Processor	3
Driver/Messengers	3

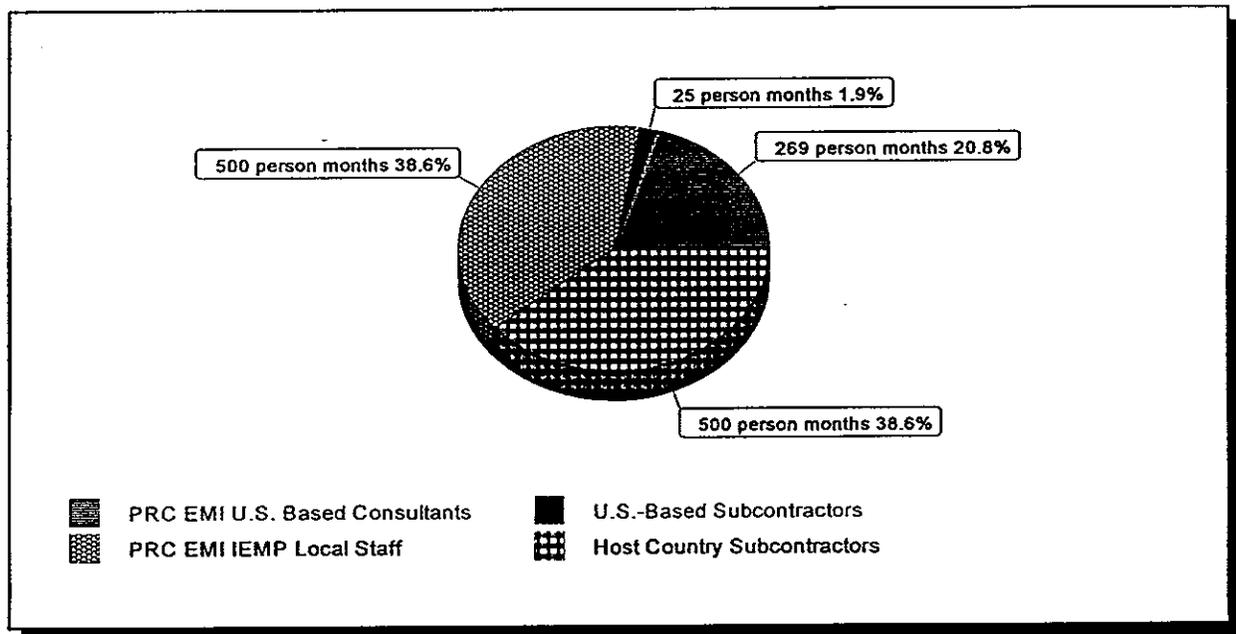
## 2.4 COMMODITIES PROCUREMENT

PRC EMI prepared annual commodity procurement plans in consultation with DENR for USAID approval. Appendix B is a complete listing of commodities purchased with project funds. Two general classes of commodities were purchased: office equipment (computers, telephones, copy machines, and so on); and field sampling equipment needed to support workshops, particularly the Data Collection, Sampling, and Sample Analysis (DCSSA) workshop. No vehicles were purchased with project funds. During the early mobilization stage, PRC EMI provided computers needed for implementation, and continued to provide computers to support project activities throughout the life of the project in addition to those purchased with project funds.

TABLE 2-1. CORE PROJECT STAFF

## 2.5 SUBCONTRACTS AND DISTRIBUTION OF LABOR

PRC EMI utilized a strong team of U.S.-based subcontractors and local firms to provide the professional expertise and the networking necessary for successful project implementation. PRC EMP's Host country subcontractors played a key role in successful project implementation. There was intensive interaction and technology transfer between U.S.-based consultants and the host country subcontractors. As the project continued there was progressively less involvement of U.S.-based consultants, and by mid-1995 virtually all workshops and all on-site PMAs were conducted by host country subcontractors and IEMP's local technical staff. Local consultants who were involved in IEMP implementation are an important technical resource that can be tapped by Philippine industry and government to provide a range of environmental services even beyond IEMP.



The level-of-effort (LOE) labor distribution in person months for project implementation from start of project through June 1997 is shown in the above chart. Table 2-2 lists all IEMP subcontractors and the services provided for the project.

The subcontractors remained with PRC EMI throughout implementation except for Philippine Ecological Network (PEN) which voluntarily withdrew as a subcontractor for reasons relating to their policy regarding subcontracting, and J.V. Arambulo & Associates whose services were terminated early in the project. During the later stages of the project, IEMP also entered into service agreements with independent local consultants.

SUBCONTRACTORS	IEMP INVOLVEMENT
<b>U. S. Based Subcontractors</b>	
RCG/Hagler, Bailly, Inc. (HBI)	<i>policy studies and public/private dialogues</i>
Coalition for International Environmental Research & Associates (CIERA)	<i>special technical services</i>
<b>Philippine Subcontractors</b>	
Environmental Primemovers of Asia (EPAI) (now Woodward-Clyde Philippines)	<i>technical services, policy studies and dialogues, workshops, and PMAs</i>
Center for Research and Communication (CRC) (now University of Asia and the Pacific)	<i>policy studies and public/private dialogues</i>
University of the Philippines Engineering Research and Development Foundation, Inc. (UPERDFI)	<i>technical services for workshops and PMAs</i>
Schema Konsult, Inc. (SKI)	<i>technical services for policy studies and dialogues, workshops, and PMAs</i>
Sycip, Gorres, Velayo & Co. Consulting (SGV)	<i>financial services; policy studies</i>
J. V. Arambulo & Associates	<i>logistical support and personnel services</i>
Philippine Ecological Network (PEN) (an NGO)	<i>liaison and support services with Philippine NGOs</i>

TABLE 2-2. IEMP SUBCONTRACTORS AND PROJECT INVOLVEMENT

## 2.6 CONTRACT AMENDMENTS

As the project is implemented, contract amendments were necessary to adjust to project implementation concerns and issues. Table 2-3 presents contract amendments approved by USAID.

Contract Amendment No.	Date	Purpose
1	September 23, 1992	provide for a no-cost realignment of the contract budget, and revise the list of subcontractors
2	October 22, 1992	increase the project funding obligation from partial to fully funded
3	July 30, 1993	realign the contract budget, increase the level of effort, correct contract estimated completion date, revise key personnel, and adjust the number of reports required
4	February 7, 1994	realign the contract budget, increase the level of effort, and provide for a change in key personnel
5	July 5, 1994	realign the contract budget
6	August 2, 1995	set a cap on annual salary increases
7	September 5, 1995	add a Contractor Performance Report requirement
8	July 15, 1996	provide for a no-cost extension of the contract completion date from September 30, 1996, to February 28, 1997, and realign the contract budget
9	February 26, 1997	provide for a no-cost extension of the contract completion date to June 30, 1997, and realign contract budget

TABLE 2-3. IEMP CONTRACT AMENDMENT

## 2.7 MID-TERM PROJECT EVALUATION

USAID/Manila commissioned a mid-term project evaluation over a 6-week period between August 15 and September 24, 1994, conducted by the Pragma Corporation<sup>1</sup>. The purpose of the evaluation was to assist USAID in (a) assessing IEMP's overall goals and objectives, (b) evaluating project performance, and (c) generating recommendations for the future direction of the project during its remaining 2 years of implementation. In general, the evaluation team found that IEMP's contractors and grantees were satisfactorily carrying out the main activities of the project's three components.

<sup>1</sup>FINAL REPORT - INDUSTRIAL ENVIRONMENTAL MANAGEMENT PROJECT MID-TERM EVALUATION, USAID/Philippines, Project No. 492-0465, September 24, 1994; The Pragma Corporation, Independence Square, 116 East Broad Street, Falls Church, Virginia, 220406, USA

Appendix C summarizes the findings and recommendations of the evaluation team and IEMP's response to these recommendations.

## 2.8 PROJECT EXTENSIONS

On July 15, 1996, USAID approved a 5-month no-cost extension of IEMP as requested by DENR. The extension period covered October 1, 1996 to February 28, 1997. The purpose of the extension was to support DENR in implementing a number of special activities and policy initiatives identified by DENR, and to supplement core project outputs. The special activities identified for this extension were:

- ◆ Assist LLDA in implementation of a pollution charge system
- ◆ Expand IEMP's database to prepare for a national pollution charge system
- ◆ Conduct ecoprofile of PHIVIDEC Regional Growth Center
- ◆ Assist DENR in DAO 21 system review and evaluation
- ◆ Assist DENR to develop guidelines for environmental assessment of major mine sites
- ◆ Provide an information, education, and communication (IEC) program coordinator for implementation of IEMP policy recommendations

A second no-cost extension at DENR's request was approved for 4 months ending June 30, 1997 for the following special activities:

- ◆ Assist DENR to implement DAO 96-37, the new EIS System regulations
- ◆ Improve DAO 11 based on PHIVIDEC ecoprofile implementation
- ◆ Assist DENR in institutionalizing PMA at the regional level
- ◆ Provide further assistance on RA 6969 implementation
- ◆ Continue information, education, and communication (IEC) assistance to DENR and Davao City Chamber of Commerce and Industry, Inc.
- ◆ Provide industrial environmental management linkage to Coastal Resource Management Project (CRMP) in selected CRMP learning areas

## 3.0 CONTRACTOR'S APPROACH

This section of the End-of-Project report will discuss the implementation strategy developed by PRC EMI to achieve the project's goal, objectives, and expected outputs.

### 3.1 PROJECT ACTIVITIES

IEMP's aim is to provide industry and DENR with the tools to: (1) identify and evaluate cost-effective methods for reducing or preventing pollution; (2) develop action plans to strengthen existing environmental regulations and identify market-based incentives to encourage compliance with discharge standards; and (3) increase the capacity of the private sector to improve waste management and the public sector to improve compliance testing and monitoring. This goal was to be accomplished through the 3 project components:

#### POLLUTION REDUCTION INITIATIVE (PRI)

The PRI assessed how to prevent and reduce industrial pollution in selected industrial subsectors, and provided support to volunteer firms through:

- ◆ Waste minimization workshops
- ◆ On-site pollution management appraisals, or PMAs
- ◆ Technical support for firms implementing waste minimization opportunities identified by the PMA process

#### POLICY STUDIES AND PUBLIC/PRIVATE DIALOGUES

A wide range of policy studies were conducted to improve environmental management, identify incentives to encourage voluntary compliance with discharge standards, and promote social welfare. These studies were presented to stakeholders through dialogues to enhance public awareness of industrial pollution and environmental policy initiatives.

## CAPABILITY BUILDING

Capability building supported project activities with training programs designed to increase the technical, policy, and administrative skills of participants at the local and national levels, and, at the same time, increase the technical capacity of local consultants working with the PRC EMI implementation team.

### 3.2 IMPLEMENTATION ARRANGEMENT

Overall PRC EMI project management and administration was provided by the IEMP Chief of Party (COP) who was responsible for project implementation to achieve the project goal and objectives, as well as to ensure that all terms and conditions of the PRC EMI contract were fulfilled. The COP, with DENR and USAID guidance and with the full cooperation of EMB, was responsible for program development, workplans, and tasks required for successful project implementation. The COP was also responsible for coordinating project activities with appropriate government agencies and institutions, industry associations and firms, NGOs, other donor projects, IEMP subcontractors, and the PRC EMI Home Office Coordinator in the U. S. The COP reported directly to the USAID Project Officer and the EMB Director. The COP was assisted in these duties by the IEMP Technical Operations Manager (TOM) and other technical and administrative staff of PRC EMI's Manila office. Project management and coordination structure is shown in Figure 3-1.

#### 3.2.1 Key Project Responsibilities

USAID, DENR, and PRC EMI played major roles in project implementation.

**United States Agency for International Development** is the funding agency for IEMP with overall responsibility for project management. USAID, through the Office of Environment (OE), formerly the Office of Natural Resources, Agriculture and Decentralization (ONRAD), provided overall guidance for project implementation. USAID directed project activities to ensure that the project goal and objectives were consistent with the strategic objectives of USAID, AID's Asian Bureau, and with the Philippine Strategy for Sustainable Development. Overall management direction to PRC EMI was provided by the USAID Project Officer, through the USAID Contracting Officer.

**Department of Environment and Natural Resources**, through the Environmental Management Bureau (EMB), had overall implementation responsibility. EMB initially provided overall direction for project implementation and coordination with the various divisions within EMB and other DENR bureaus, LGUs, regional DENR offices, and NGOs. EMB directions were

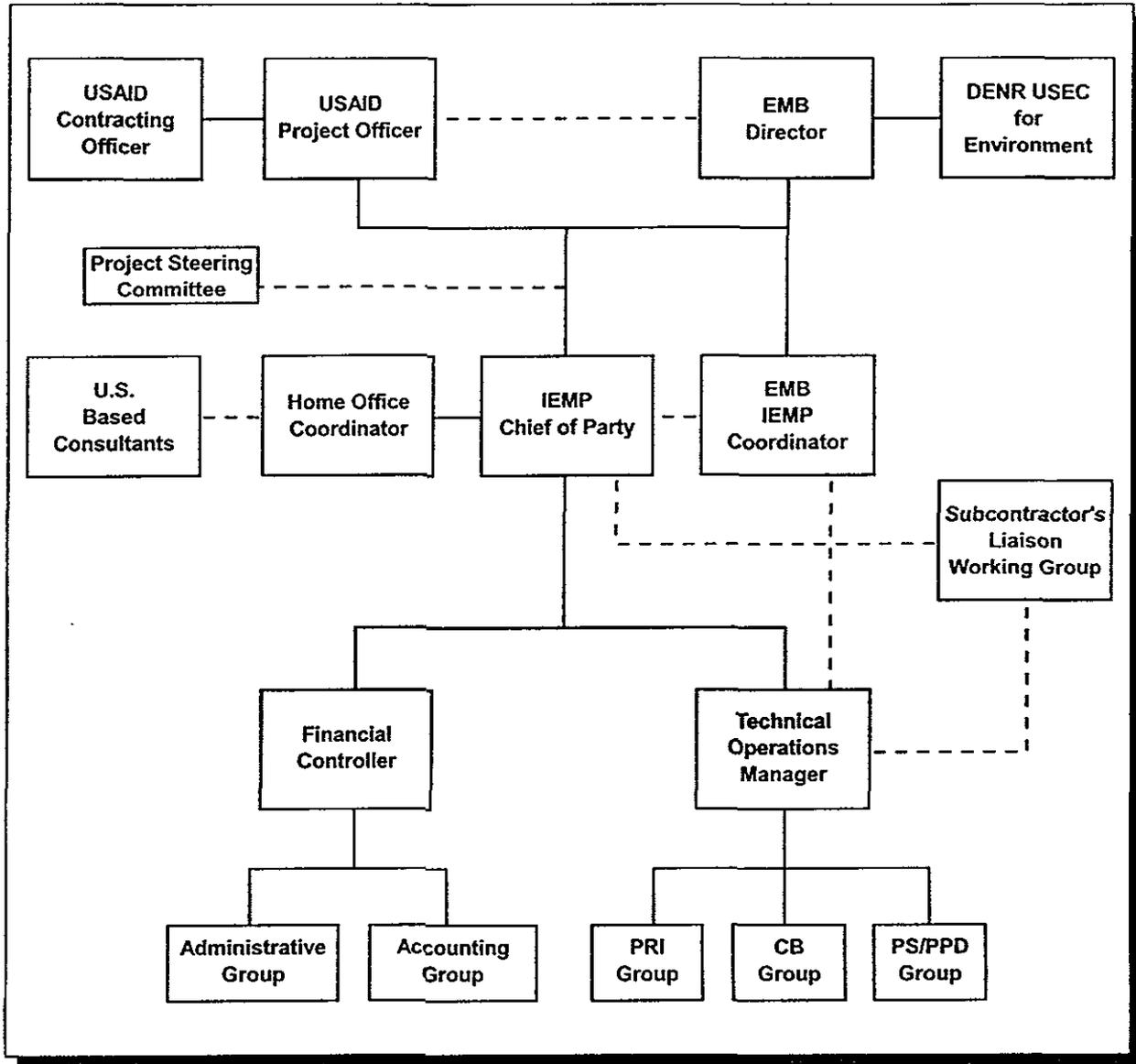


FIGURE 3-1: IEMP MANAGEMENT AND COORDINATION STRUCTURE

disseminated to PRC EMI through the EMB Director or Assistant Director, and the Project Steering Committee (PSC). In 1995, the DENR Undersecretary for Environment and Programs Development provided direction through the IEMP Coordinator.

PRC Environmental Management, Inc. (PRC EMI) managed and administered the IEMP contract in accordance with the terms and conditions specified by the contract. Technical expertise was

provided through PRC EMI's pool of expertise in the United States, subcontractors, and local technical and administrative staff.

### 3.2.2 Project Steering Committee

The project steering committee identified in the PP evolved from a "steering group" proposed in the first Annual Plan of Work (APW) and was initially intended as an advisory body for a proposed IEMP Project Management Unit (PMU). The PMU however did not materialize and instead, only a project management desk headed by an IEMP Coordinator was set up at EMB. An amendment to the first APW revitalized the steering group into the Project Steering Committee (PSC). The PSC membership and responsibilities varied from time to time over the life of the project but was originally constituted as follows:

- ◆ EMB Director, Chairperson
- ◆ EMB Assistant Director, member
- ◆ IEMP Coordinator, member
- ◆ USAID Project Officer, member
- ◆ USAID Project Manager, member
- ◆ PRC EMI Chief of Party, Secretary
- ◆ Subcontractor Representative, member
- ◆ Representatives of other subcontractors on an as needed basis
- ◆ Others (as recommended by USAID, EMB, or PRC EMI)

The following are the terms of reference of the PSC:

- ◆ Facilitate coordination of implementation activities with project beneficiaries
- ◆ Review work progress according to the approved APW
- ◆ Identify, discuss and resolve issues that may impede implementation
- ◆ Review and approve or disapprove APW

- ✦ Review and approve or disapprove proposed amendments to the APW
- ✦ Provide continuous direction to IEMP team

In 1995, the DENR Undersecretary for Environment and Programs Development created another PSC within the DENR. This DENR PSC was headed by the Undersecretary, with members representing other DENR offices, such as the Field Operations Office, Foreign Assistance and Special Projects Office, EMB, Legislative and Legal Office, Office of the Secretary, and other DENR related projects.

### 3.2.3 Subcontractors Liaison Group

PRC EMI subcontractors were an important and valuable resource in achieving project success. The technology transfer from PRC EMI to host country subcontractors and individual consultants is one of the success stories of IEMP. Over the life of the project, approximately 60 individual local consultants were involved in project implementation. A Subcontractors Liaison Group (SLG) was established to ensure that contractors would be involved in IEMP planning activities. The SLG was organized to represent each of the three project components and included representatives from each U.S.-based and host country subcontractors. The terms of reference of the SLG included:

- ✦ Coordinating subcontractor activities with IEMP staff
- ✦ Ensuring that subcontractors are involved in all phases of project planning, implementation, and reporting
- ✦ Providing feedback to their respective firms
- ✦ Participating in task forces and quick response groups to respond to specific project issues

The PSC and the SLG proved effective management tools for guiding project implementation. While their respective roles changed over the life of the project, the results achieved by the project are in large part due to the dedication and guidance of each organization.

## 3.3 REPORTING

PRC EMP's contract required the following reports: (1) Life of Project Workplan; (2) Annual Plans of Work; (3) Quarterly Reports; (4) Short-Term Consultant Reports; (5) Technical Reports; (6) Special Reports; (7) End-of-Assignment Report; and (8) End-of-Project Report.

### 3.3.1 Annual Plans of Work and Activity Workplans

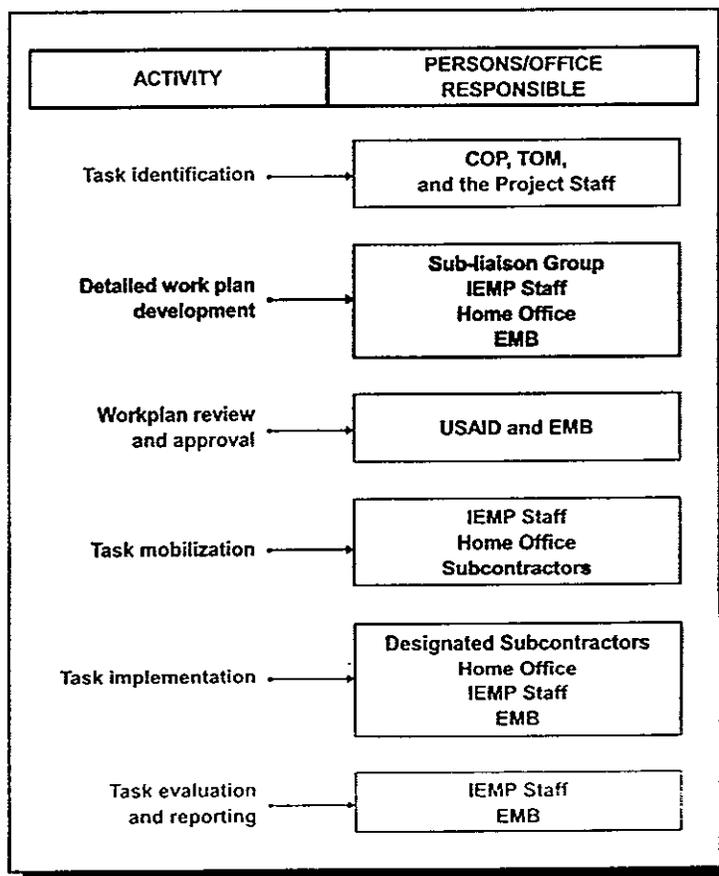
Annual Plans of Work (APW) were the major planning documents for IEMP implementation and required PSC input and approval for all proposed activities. Approved project activities were initiated by workplans that defined implementation tasks, identified the consultants who would implement each task, and provided cost estimates for budgetary control. Although not a required report under the contract, PRC EMI prepared specific activity workplans that gave detailed tasks, schedules, and consultants involved. These workplans were reviewed and approved by EMB and USAID. Activity workplans proved to be valuable management tools for organizing implementation activities, assigning subcontractor labor, and tracking costs for cost accounting. IEMP subcontractors played an active role as members of the IEMP team in preparing workplans and in identifying the most qualified consultants to carry out task assignments.

Project resources were managed by PRC EMI through a Delivery Order (DO) system. A DO committed project resources and responsibility to subcontractors for workplan tasks described in the DO. Delivery orders were accountable project documents for encumbering financial resources and labor and were subject to audit.

The typical IEMP workplan implementation flowchart is shown in Figure 3-2.

### 3.3.2 Administrative and Technical Records and Reports

Significant information sources for project outputs, performance monitoring, and impact assessment are listed below. Except for PMA confidential business reports (CBR), all IEMP reports are on file at EMB and USAID.



**FIGURE 3-2. WORKPLAN IMPLEMENTATION FLOWCHART**

**On-site PMA Reports** - characterize the operation of each volunteer firm, identify waste streams, and recommend low-cost/no-cost and capital intensive waste minimization opportunities.

Survey and Assessment (SA) Reports - verified progress of PMA volunteer firms in implementing waste minimization options.

National/Regional Industry Prioritization Strategy (NRIPS) Implementation Report - established the basis for prioritizing industry subsectors and regions to focus IEMP's waste minimization program.

Workshop Evaluation Reports - documented participants' responses on the quality and content of workshops.

IEMP Quarterly Progress Reports - routine updates of implementation progress.

Policy Study and Public and Private Dialogue Reports - document policy research, findings and recommendations, and record public and private forums on national policy reforms.

### 3.4 PERFORMANCE MONITORING AND IMPACT ASSESSMENT

An important consideration of project designers and the implementation contractor is how the project will be monitored and evaluated. Project Paper manager's questions are summarized as follows:

- ◆ **Goal Level:** to what extent has the project contributed to regional industrial growth in areas PMAs have been conducted, and to what extent have the same PMAs contributed to a reduction in pollution-related absenteeism?
- ◆ **Purpose Level:** what percentage of firms receiving PMAs have adopted PMA recommendations? Were production costs reduced and by how much? And was there an accompanying reduction in pollution generation?
- ◆ **Output Level:** was an environmental risk assessment completed, and were high-risk industry sectors prioritized for PMA intervention?

The key impact indicators suggested by the PP for assessing project performance included:

- ◆ **Industrial Firms:** the number of firms volunteering to participate in PMAs; measures taken to reduce waste by participating firms; cost savings; added revenues; and other benefits.
- ◆ **Government:** the number of policy analyses and public and private dialogues that lead to improved social conditions, advance DENR's skills, improve databases, and measures of DENR in dealing with polluting industries.

- ✦ Others: reduced downstream damage to crops, fisheries, tourism and other income-generating sectors.

The Project Design Summary Logical Framework lists verifiable indicators at the goal, purpose, and output levels. In 1993, PRC EMI recommended a monitoring program to facilitate the evaluation of the performance of IEMP and the assessment of its impact at the end of the project. The recommended project performance evaluation, impact indicators, and verification procedures are discussed in detail in Section 5.

These impact indicators, together with the PP Logical Framework and USAID/Manila Mission's Results Package 3 indicators were used by PRC EMI to monitor and assess IEMP's impact.

## 4.0 PROJECT ACTIVITIES AND OUTPUTS

PRC EMI's contract scope of work specified implementation activities that have direct impact on DENR and EMB, industry associations and firms, LGUs, and NGOs. PRC EMI provided the technical, management, and administrative services to support implementation activities for the three project components: (1) Pollution Reduction Initiative; (2) Policy Studies and Public/Private Dialogues; and (3) Capability Building. The implementation methodology developed by the IEMP team with USAID and DENR is discussed in detail in this section. Each subsection presents a "QUICK SUMMARY" where appropriate to quickly and conveniently report outputs or the quantitative value of project impact indicators, followed by discussion. Also, where appropriate, we have provided comments to clarify or update implementation activities.

The following Quick Summary is an overview of the major project performance and impact indicators. Goal Level indicators have been measured, but some indicators recommended at the Purpose Level have not been measured, or have been incompletely measured because of lack of time, resources, or both.

<b>QUICK SUMMARY</b>	
<b>GOAL LEVEL</b>	
Investments made by volunteer firms	\$26,985,800
Annual net benefits from investments	\$33,065,342
Reduction in pollution load (BOD)	29%
<b>PURPOSE LEVEL (Propensity for Change)</b>	
Number of firms that voluntarily expressed interest in IEMP	Over 400
Ratio of firms implementing low-cost ( under \$2,000) options	26%
Ratio of firms implementing capital intensive (over \$2,000) options	74%
GOP policy initiatives to promote pollution prevention and control	Not measured
Quantitative increase in enforcement response or compliance rate	Not measured

QUICK SUMMARY	
<b>PURPOSE LEVEL (Infusion of Capital)</b>	
Increase in capital investment by GOP and international agencies in pollution prevention and control	Not measured
Quantifiable increase in GOP human resources skilled in environmental management, monitoring, and enforcement	Approx. 1,200
Increased private sector investment in environmental pollution control	Not measured
<b>PURPOSE LEVEL (Acquisition of Technology)</b>	
Ratio of volunteer firms that implemented pollution prevention and control technologies and practices	Over 90%
Use of IEMP training manuals and publications by EMB and target industries	Not measured
Increased incorporation of pollution prevention technologies and measures into environmental requirements	Not measured

Project achievements are also compared to the Project Paper Purpose Level Indicators as shown in Table 4-1.

## 4.1 PROJECT MILESTONES

Table 4-2 is a brief summary of significant milestones in the implementation of IEMP. More complete listings of workshops, PMAs, public/private dialogues, and other project activities can be found in the Appendices of this report.

PROJECT PAPER PURPOSE LEVEL INDICATORS	PROJECT ACHIEVEMENTS
Fifty percent of the firms that carry out PMAs will adopt new methodologies and purchase and install pollution prevention reduction equipment.	26% of PMA firms have implemented no-cost or low-cost waste minimization opportunities; 74% of PMA firms have implemented capital intensive waste minimization opportunities (investments over ₱50,000) that include process changes, new equipment, or both.
Approximately 5 to 10% reduction in production costs at firms participating in PMAs	Measured as investments in waste minimization and benefits received: at end of project PMA volunteer firms had invested \$26,986,000 resulting in annual net benefits of \$33,065,000
Estimated 5 to 10% decrease in industrial pollution at firms participating in PMAs	29% aggregate BOD reduction by PMA volunteer firms

**TABLE 4-1. PROJECT IMPACT AT PURPOSE LEVEL**

## 4.2 POLLUTION REDUCTION INITIATIVE (PRI) COMPONENT

The objectives of the PRI component were to: (1) identify the most pollutive industrial subsectors; (2) assist firms in those subsectors to adopt waste minimization as a strategy to reduce pollution generation; and (3) quantify the impact of waste minimization on Philippine industry. The tools developed to achieve these objectives were the National/Regional Industry Prioritization Strategy (NRIPS), the pollution management appraisal (PMA), and the PMA Performance Monitoring System (PMA PMS) database. Approximately 30 percent of project resources were expended on PRI. One hundred forty three firms nationwide received direct technical assistance from the project through the conduct of PMAs. Appendix D lists these firms. The program was also able to train at least 44 local consultants in conducting PMAs and developing waste minimization programs for industries. Names of these consultants are listed in Appendix E.

ACTIVITY	DATE
<b>1992</b>	
IEMP contract signed by USAID and PRC EMI, project implementation begins	July 9
IEMP Pre-implementation Workshop	August 20-21
First APW approved by USAID and EMB	October 7
First PMA workshop	October 12-16
First round of on-site PMAs conducted	October 19-29
First Industrial Seminar	November 17
IEMP subcontractors approved by USAID	October-December
<b>1993</b>	
First Environmental Impact Assessment (EIA) workshop	February 8-12
First Environmental Risk Assessment (ERA) workshop	February 22-26
DENR Administrative Order 17 signed	February 24
First Compliance Monitoring (CM) workshop	May 3-7
First Data Collection, Sampling, and Sample Analysis (DCSSA) workshop	June 21-25
IEMP project office relocated to JMT Corporate Condominium, ADB Ave, Pasig	August 1
Project Steering Committee meeting	September 2
First issue of IEMP Newsletter, INDUSTRY ENVIRONEWS	November
First Compliance Audit (CA) workshop	November 3-6
National/Regional Industry Prioritization Strategy (NRIPS) Report	November 11
<b>1994</b>	
Project Steering Committee meeting	January 24
Project Steering Committee meeting	February 7
1994 APW approved by USAID and DENR	February 7
First Annual DENR Industrial Recognition Award	June 29

ACTIVITY	DATE
Mid-term project evaluation	Aug 16-Sept 23
Project Steering Committee meeting	December 19
<b>1995</b>	
Project Steering Committee meeting	January 17
1995-96 APW approved by USAID and DENR	January 19
Second Annual DENR Industrial Recognition Awards	June 29
<b>1996</b>	
Project Steering Committee meeting	January 16
Project Steering Committee meeting	March 4
Third Annual DENR Industrial Recognition Awards	June 28
USAID approved 5-month no-cost extension of IEMP	July 15
EMB Internet Home Page on-line	November
<b>1997</b>	
Final Project Steering Committee close-out meeting	February 12
USAID approved 4-month no-cost extension of IEMP	February 26
First project extension completed	February 28
Second project extension completed	June 30

**TABLE 4-2. IEMP IMPLEMENTATION MILESTONES**

In order to operationalize PRI and effectively use project resources, two pre-conditions for successful project implementation were addressed. The first was to provide incentives to encourage firms to voluntarily join IEMP's waste minimization program; and the second was to prioritize industry subsectors to efficiently and effectively focus limited DENR resources. Department Administrative Order (DAO) 17 provided for a moratorium of up to one year against cease and desist orders (CDO) for non-compliance; and NRIPS was conducted to prioritize industry subsectors and individual firms for relative potential risk to public health.

In this section, we review the PRI implementation strategy that evolved from the original PRC EMI contract scope of work into a series of activities or steps that were repeated numerous times during implementation to achieve project outputs. The process required close coordination with DENR

regional offices, potential volunteer firms, the IEMP team, and industrial and professional associations. Initial efforts by the IEMP team produced early results that were fed back into the process to recruit volunteer firms. Recruitment package presented to firms included success stories, waste reduction practices, and modified or new technologies, all based on actual Philippine experience.

The PRI implementation strategy can be divided into the following steps: prioritizing industrial targets; recruiting volunteer firms; conducting PMA workshops; collecting baseline data from volunteer firms; conducting on-site PMA; writing the PMA Report; conducting survey and assessment to check progress implementation; and developing and maintaining PMA PMS. Each step is discussed further in the following subsections.

To achieve consistency in process flow, products, and results, PRC EMI designed a series of Pollution Management Appraisal Guidelines for IEMP staff and subcontractors, and for DENR regional offices to aid in institutionalizing the PMA process. Special workshops conducted by IEMP introduced these guidelines to DENR Environmental Management Division personnel in all regions. The four volume series codifies the processes developed by IEMP to collect, manage, and utilize valuable data collected during PRI implementation. These volumes are a valuable resource for DENR regional offices who now must manage the PMA process established by IEMP. The Pollution Management Appraisal Guidelines consist of the following volumes, which are referenced in the following discussions:

- Volume 1: PMA Report Writing
- Volume 2: Baseline Data Collection
- Volume 3: Survey and Assessment
- Volume 4: Performance Progress Monitoring

#### 4.2.1 Prioritizing Industry Targets

One of the most significant outputs of the project was the prioritization of industry subsectors according to relative potential risk to public health. In 1993, the IEMP team with the active support of EMB and DENR regional offices, developed a methodology for prioritizing industries and industry subsectors called the National/Regional Industrial Prioritization Strategy, or NRIPS. The results of the NRIPS ranking were used by IEMP and EMB to prioritize industry subsectors starting in mid-1993.

QUICK SUMMARY	
<b>OBJECTIVE:</b>	Identify the priority industry subsectors based on relative potential risk to public health
<b>ACTIVITY:</b>	Develop survey methodology and conduct survey
<b>DELIVERABLE:</b>	National/Regional Industry Prioritization Strategy (NRIPS) national and regional priority lists

The NRIPS methodology was developed to compile information about the sources of pollution, the pathways for release of the pollution from an industrial facility to the surrounding environment, and the types of receptors present in the surrounding community and therefore at risk from exposure to the pollution. The macro environmental risk assessment approach for industries considered three elements:

- ◆ **Sources of Pollution** - spills, contaminated sites, and routine discharges of wastes or pollutants
- ◆ **Pathways** - routes along which pollutants may migrate such as groundwater, surface water, air or soils
- ◆ **Receptors** - humans, physical environments, and ecological systems

Compliance status was added to assess the potential that pollution would be released from the source. For each of these risk elements, factors were identified that when evaluated would provide useful information to characterize risk.

The NRIPS methodology was used to determine the number of points to assign to a facility. These scores were then used for comparative ranking. The following considerations were taken into account in arriving at a facility's score:

- ◆ **Industry Considerations:** the hazardous nature and pollutive qualities of the waste generated by an industrial subsector
- ◆ **Waste Generation and Management:** waste quality, waste type, type of pollution control equipment, and compliance history of individual facilities
- ◆ **Pathways:** prevailing wind direction, rainfall, terrain, and groundwater depth
- ◆ **Media and Receptors:** location of nearest community, surface water usage (domestic and recreational), and location of groundwater wells
- ◆ **Noncompliance:** assessment of a firm's compliance record and complaints on file with DENR

Each of the DENR regional offices were visited and information using the NRIPS checklists was collected on 30 to 50 percent of the total number of facilities on file in each of the 15 regions including LLDA, which was considered as one region. Over 3,300 facility files were reviewed representing 156 industrial subsectors. Approximately 30 percent of the facilities investigated were also visited to confirm information from the DENR regional office files. Using the NRIPS scores,

industry subsectors and individual facilities were ranked to represent their relative potential risk to public health.

PRC EMI recommended that NRIPS regional rankings be used by DENR to allocate compliance monitoring resources to industries with the greatest risk to public health and for implementation of action plans that address the most serious threats to communities and natural resources. Tables 4-3 and 4-4 taken from NRIPS are included in the body of this report since they represent one of the most significant project outputs. Regional rankings are included in Appendix F.

Industrial Category (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1. Gold Ore Mining (2110)	16/185	62.8
2. Coal Mining (2210)	6/7	62.3
3. Steam Heat and Power Plants (4220)	3/3	60.8
4. Sugar Milling and Refining (3123)	39/40	59.1
5. Manufacture of Pulp, Paper, and Paperboard (3411)	27/34	55.9
6. Manufacture of Desiccated Coconut (3125)	12/13	53.8
7. Malt Liquors and Malt (3133)	6/7	52.9
8. Nickel Ore Mining (2140)	4/6	52.6
9. Copper Ore Mining (2130)	4/8	51.3
10. Manufacture of Carpets and Rugs (3214)	2/7	51.3
11. Non-Ferrous Smelting and Refining Plant, Except Precious Metals (3722)	11/11	51.0
12. Distilling, Rectifying, and Blending Spirits (3131)	17/19	50.1
13. Manufacture of Cement (3630)	16/18	50.1
14. Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	31/31	50.0

**TABLE 4-3. INDUSTRY CATEGORIES HAVING AVERAGE NRIPS SCORES PER FACILITY  
GREATER THAN 50 - NATIONWIDE**

Industrial Category (NEDA Classification Code)	Number of Facilities Scored/Files Identified	NRIPS Score
1. Sugar Milling and Refining (3123)	39/40	59.1
2. Manufacture of Pulp, Paper, and Paperboard (3411)	27/34	55.9
3. Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	31/31	50.0
4. Manufacture of Vegetable and Animal Oils and Fats (3117)	35/48	48.5
5. Gold and Other Precious Metal Refining (3721)	39/39	46.9
6. Tanneries and Leather Finishing (3231)	31/31	45.8
7. Spinning, Weaving, Texturizing, and Finishing Textiles (3211)	51/59	45.4
8. Soft Drink and Carbonated Water Manufacturing (3134)	40/45	45.0
9. Manufacture of Electric Wires and Wiring Devices (3836)	33/42	44.9
10. Steel Works and Rolling Mills (3712)	66/68	44.5
11. Production of Crude Coconut Oil, Including Cake and Meal (3116)	31/46	43.8
12. Hog Raising (1213)	235/1,110	43.4
13. Canning, Preserving, and Processing Fish, Crustacea, and Other Seafood (3115)	66/91	43.0
14. Manufacture of Basic Industrial Chemicals, Except Fertilizers (3511)	41/73	42.7
15. Slaughtering, Preparing, and Preserving Meat (3111)	61/70	42.5
16. Manufacture of Rubber Products, Not Elsewhere Classified (3559)	58/71	42.4
1. Generating and Distributing Electricity (4110)	55/134	40.9
2. Canning and Preserving of Fruits and Vegetables (3114)	48/67	39.8
3. Iron and Steel Foundries (3713)	30/30	38.3
4. Non-Ferrous Foundries (3724)	25/25	37.8
5. Manufacture of Food Products, Not Elsewhere Classified (3129)	29/73	36.7
6. Manufacture of Bakery Products (3122)	107/191	36.0
7. Petroleum and Petroleum Products, Wholesaling (6180)	62/76	33.4
8. Mfg. of Wood, Cork, and Cane Products, Not Elsewhere Classified (3319)	25/25	32.1
9. Sand and Gravel Quarrying (2236)	32/62	30.7
10. Manufacture of Non-Metallic Mineral Products, Not Elsewhere Classified (3699)	103/200	29.4
11. Tire and Tube Manufacturing (3551)	42/54	28.7
12. Chicken Raising (1221)	122/284	28.3
13. Sawmills and Planing Mills (3311)	271/1,212	27.6
14. Mfg. and Repair of Rattan Furniture Including Upholstery (3322)	32/101	26.6
15. Rice and Corn Milling (3118)	449/4,380	26.2
16. Manufacture of Plastic Products, Not Elsewhere Classified (3560)	56/60	25.8
17. Manufacture and Repair of Wood Furniture, Including Upholstery (3321)	57/74	24.5
18. Ready-Made Clothing Manufacturing (3222)	47/56	22.0
19. Manufacture of Ice, Except Dry Ice (3126)	37/54	21.8
20. Manufacture of Prepared and Unprepared Animal Feeds (3128)	70/147	20.2

**TABLE 4-4. AVERAGE NRIPS SCORE PER INDUSTRY SECTOR FOR INDUSTRIAL CATEGORIES IN WHICH MORE THAN 25 FACILITIES WERE EVALUATED**

#### 4.2.2 Recruitment of PMA Volunteer Firms

Recruitment of volunteer firms started with goodwill visits to targeted regions to brief DENR officials and local industry and professional organizations on IEMP program, goals, and objectives; identify targeted industry subsectors; and request assistance in organizing the follow-on industry seminar (IS). The assistance provided by DENR and industry and professional organizations were key components of the recruitment process and the value of their assistance and cooperation cannot be overstated.

The IS was the initial exposure of potential volunteer firms to the concept of waste minimization, the PMA process, and the benefits of joining the IEMP program. The IS was the first step in a successful implementation strategy that included individual visits to prospective volunteer firms, assisting firms in obtaining baseline data on emissions and effluents, the PMA workshop, and the on-site PMA. The marketing “products” developed by IEMP to convince firms to volunteer for a PMA were initially based on U.S. case studies but were gradually “Philippine-ized” as implementation results and success stories became available through actual PMAs. IEMP’s product line included:

- ◆ **Concept:** waste minimization pays through increased profits and efficiency, reduced waste volume, improved compliance with DENR discharge and emission standards, and improved corporate image
- ◆ **Waste Reduction Practices:** cost-effective waste minimization opportunities supported by Philippine case studies (Success Stories)
- ◆ **Waste Reduction Technologies:** examples of actual process modifications, or new process technologies adopted by volunteer firms
- ◆ **Process:** the PMA, preceded by a PMA workshop to introduce waste minimization, followed by post-PMA survey and assessments to verify results

IEMP’s product package and marketing strategy was successful in recruiting over 35 percent of the firms that attended PMA workshops, a rate of recruitment considered high by marketing standards.

Incentives for and obligations of PMA volunteer firms were established by Department Administrative Order (DAO) No. 17 in February 1993: *Guidelines Governing Voluntary Participation in Pollution Management Appraisals of the Industrial Environmental Management Project*, which included the following:

- ◆ **Section 2 - Moratorium on Compliance to Effluent and Emission Standards** granted a moratorium on issuance of Cease and Desist Orders (CDOs) for not more than 12 months to participating volunteer firms that show serious efforts to implement recommended no-cost and low-cost waste management options (identified

by the PMA). For waste minimization options requiring substantial capital investments, this section also provided for ample time for firms to raise the required capital and to comply with standards.

- ◆ **Section 3 - Financing for Investment Outlays for Waste Management** offered IEMP assistance to participating volunteer firms in coordinating and matching specific industrial targets (capital intensive waste minimization options identified by the PMA) to financing sources (commonly referred to as “Bankable PMAs”).
- ◆ **Section 4 - Confidential Business Reports** provided that information collected during the PMA would not result in DENR regulatory action, and that confidential information would not be made available to commercial competitors or to other government agencies.
- ◆ **Section 5 - Regulatory Actions of Sanctions** provided that DENR shall impose regulatory action or sanctions to motivate pollutive firms to join IEMP. In addition, EMB shall refer firms with pollution cases to the IEMP to participate in PMA.

Volunteer firms were required to sign a Memorandum of Agreement (MOA) with the regional DENR office to join IEMP’s PMA program and qualify for the benefits stipulated in DAO 17. In addition to the incentives and requirements of DAO 17, the MOA provided that PMA volunteer firms would:

- ◆ Reasonably share with IEMP the process, manufacturing, operation, and financial data needed to determine the financial and technical feasibility of waste minimization options
- ◆ Cost-share expenses with IEMP for the PMA workshop and PMA on-site by providing hotel, transportation, and other expenses for their participants attending the PMA workshop, and by providing ground transport and accommodation expenses for the IEMP PMA team during on-site appraisal

COMMENTS	
(1)	In the early stages of the project some firms did take advantage of the moratorium from CDOs without fulfilling their obligations under the MOA. However, this practice was not a major problem and was a rare occurrence in later stages due to improved reporting requirements on the part of the volunteer firm and IEMP’s recommendation to DENR to drop non-performing firms from the program.
(2)	A few firms declined to share PMA results by not allowing publication of a public version report, however, implementation results were provided to IEMP and were included in project outputs.

- ✦ Provide IEMP and DENR with bi-monthly progress reports on implementing low-cost and no-cost waste minimization options, allow IEMP to conduct survey and assessment to document waste *minimization 4 months after the PMA*, and allow DENR to join the survey and assessment team
- ✦ Agree to release the Public Version PMA Report (PVR) within 1 month after receipt of the Confidential Business Report (CBR) after the PMA firm had deleted any information considered as confidential
- ✦ Agree to the publication of a “Success Story” of implemented waste minimization options if proposed by IEMP
- ✦ Promote waste minimization at industrial association meetings and conferences and share the benefits of the PMA with other firms

#### 4.2.3 PMA Workshop

During implementation, 22 PMA workshops were conducted for industry, with an additional 2 PMA workshops for DENR, LGUs, and NGOs (Appendix G). PMA workshops were not originally intended to be as numerous as the actual workshops conducted. During project implementation, however, PRC EMI saw the need to include intensive training for representatives of PMA volunteer firms in order to have effective and sustainable participation of their personnel in the PMA process. Thus, workshops became an inherent part of the whole PMA program.

To meet the demand for PMA workshops, IEMP visited most targeted regions more than once. Follow-up of interested participants were done through DENR and industrial and professional associations. IEMP also developed the concept of a rapid PMA (RPMA) for interested *non-priority firms and regions*. RPMA is a shortened workshop and generally is not followed by on-site PMAs. This allowed

<b>QUICK SUMMARY</b>	
<b>OBJECTIVE 1:</b>	Introduce Philippine industry to the concept of waste minimization and the PMA process
<b>OBJECTIVE 2:</b>	Transfer technology by training host country consultants to manage and conduct workshops
<b>ACTIVITY:</b>	24 Workshops conducted (22 for industry and 2 for public sector)
<b>EXPECTED OUTPUT:</b>	Train 200 participants
<b>ACTUAL OUTPUT:</b>	988 participants trained representing over 400 industrial firms
<b>DELIVERABLE:</b>	Participant Manual and Trainers Manual

IEMP to spread the waste minimization message to a larger audience at relatively little cost.

The PMA workshop was also the final step in the PMA recruitment process. Participation was by invitation with priority given to those firms and individuals volunteering for an on-site PMA. IEMP sponsored the workshops, but participating firms were expected to pay travel, food, and lodging expenses for their employees attending the workshop. Attendance varied from approximately 30 to 70 participants, and numbers over 50 required dividing participants into two groups for parallel runs.

PMA workshops followed a well structured outline developed by PRC EMI in the early phase of the project and were initially conducted by PRC EMI US-based consultants using U.S. case studies, assisted by host country subcontractors and independent consultants.

As confidence grew among local consultants and IEMP staff, succeeding workshops were increasingly led by local consultants using case studies based on actual PMA experience. Midway through implementation, PMA workshops were conducted exclusively by IEMP's local staff and subcontractors, assisted by senior regional DENR technical staff.

**COMMENT**

The actual output of participants trained in the PMA process was nearly 4 to 1 over expected outputs. The increased number of PMA workshops and the ability of IEMP to accommodate more participants per workshop may account for the 4:1 ratio. Also, the project planners had little basis for establishing output numbers. That over 400 firms were actually represented in 22 PMA workshops is a considerable achievement on the part of Philippine industry and indicates an interest in waste minimization that has yet to be satisfied. And, of the 400 participating firms, only 143 are included in the goal and purpose level outputs shown in the QUICK SUMMARY at the beginning of this section. However, from a survey taken by IEMP, many non-volunteer firms attending the PMA workshop did place into practice what was learned in the PMA workshops.

#### 4.2.4 Baseline Data Collection

The mid-term project evaluation emphasized the need to improve baseline data collection from volunteer PMA firms in order to better measure waste minimization implementation results. IEMP responded by developing a methodology for data collection (Volume 2 of IEMP's Pollution Management Appraisal Guidelines series) that proved successful in providing the data necessary to measure results.

In addition to the methodology for baseline data collection, the guidelines provided:

- ◆ Facility baseline data collection worksheets for PMA volunteer firms to collect the required data and to monitor emissions and effluents for compliance with DENR standards
- ◆ DENR baseline data worksheets for a compliance records search and for collecting emission and effluent samples for testing

- ✦ A list of laboratories from priority regions capable of analyzing environmental parameters

DENR regional offices were key contributors in generating baseline information by providing field technicians to collect effluent samples from PMA volunteer firms for testing samples in regional laboratories. The methodology, while lengthy and labor intensive, produced the baseline data needed to measure the impact of IEMP's waste minimization program.

#### 4.2.5 On-Site Pollution Management Appraisal

The Pollution Management Appraisal process was first introduced in the Philippines through IEMP. The PMA process is a multi-phased, systematic procedure for identifying, selecting, and implementing waste minimization and improved waste management. It consists of four phases: planning and organization, assessment, feasibility analysis, and implementation. The process is recurring as new assessments are conducted by management in response to the recognized need to continue improving operational efficiency by reducing waste generation.

The PMA workshop introduced the concept of waste minimization and the principles of the PMA process. The on-site PMA was the practical application of these principles. IEMP strictly enforced three conditions as prerequisites to conducting a PMA. The first, and most important, required volunteer firms to nominate PMA team members from management and production employees who would commit to work with the team throughout the PMA (ideally at least one of these employees would have attended the PMA workshop). Second, volunteer firms were required to provide all relevant production information, including raw materials, processes and operations, and financial information needed by the PMA team to identify technically feasible and financially viable waste minimization opportunities. And third, volunteer firms were required to commit to seriously implement at least the low-cost/no-cost waste minimization options identified by the PMA team.

Throughout the PMA process and the follow-on surveys and assessments, PMA team members of each firm were responsible for providing implementation progress reports and the operational and financial data necessary for IEMP to measure implementation results. The continuity of PMA

QUICK SUMMARY	
<b>OBJECTIVE 1:</b>	Train PMA volunteer firm personnel and local consultants in conducting PMAs
<b>OBJECTIVE 2:</b>	Institutionalize the PMA process
<b>EXPECTED OUTPUT:</b>	Up to 150 PMAs
<b>ACTUAL OUTPUT:</b>	143 PMAs at least 36 local consultants trained in waste minimization and PMA

responsibility at each firm helped to:  
 (1) institutionalize the PMA process;  
 (2) encourage follow-on PMA activities; and (3) provide a point of contact for assessing PMA results.

**COMMENT**

The IEMP performance monitoring system (PMS) recorded firm-identified and -initiated waste minimization options implemented after the original PMA on-site was conducted. This indicates that the PMA process has been institutionalized to some degree in volunteer firms.

#### 4.2.6 PMA Report

The principal outputs of the PMA were the Confidential Business Report, or CBR, and the public version report, or PVR. These reports were constructed on a PRC EMI model designed to encourage the widest possible acceptance of recommended waste minimization opportunities on the part of individual volunteer firms (the CBR). The report model also provided for easily sanitized reports for general publication as source material on waste minimization. Volume 1 of IEMP's Pollution Management Appraisal Guidelines contains detailed instructions on report preparation.

**QUICK SUMMARY**

**OBJECTIVE:**  
Identify and determine the technical and financial feasibility of waste minimization opportunities

**ACTIVITY:**  
Prepare Confidential Business Report and Public Version Reports

**EXPECTED OUTPUT:**  
Up to 150 PMA Reports

**ACTUAL OUTPUT:**  
143 Confidential Business Reports and Public Version Reports

The CBR is used by top management to make decisions on investing in actual waste minimization opportunities identified by the PMA team. The technical and financial feasibility of capital intensive options, as well as low-cost and no-cost options, were carefully presented in the CBR. The CBRs are the foundation of the IEMP database providing baseline information on (1) waste streams, (2) low-cost and no-cost as well as capital intensive waste minimization opportunities, and (3) the technical and financial feasibility of implementation. The CBR also established a common reporting format for volunteer firms to record implementation information required by IEMP to verify waste minimization results.

The PVRs were one of the most important outputs of the project and, taken in total, are a valuable resource for DENR and for public and private institution libraries. For certain subsectors they represent the most comprehensive study of pollution generation (BOD was chosen as the pollutant to track) and reduction by Philippine industry available today.

PVRs prepared by IEMP are important additions to reference libraries as source information on Philippine industrial waste minimization opportunities not previously available. These were produced in printed format and in PC diskette format. The diskette format is convenient for reproducing this

essential project output after the completion of IEMP, and USAID, DENR, and EMB were provided a complete set of these reports.

#### 4.2.7 Survey and Assessment

The conduct of survey and assessments (SA) was not identified as an activity in the Scope of Work. It was an innovation designed by PRC EMI to monitor progress of volunteer firms in meeting MOA obligations for implementing waste minimization options. Volume 3 of IEMP's PMA Guidelines series provides the methodology to verify implementation progress. Since SAs may be conducted over a prolonged period, the system was designed to track incremental results.

#### QUICK SUMMARY

**OBJECTIVE:**

Measure IEMP's impact on pollution reduction

**ACTIVITY:**

Monitor progress of PMA firms in implementing waste minimization options

**OUTPUT:**

Survey and Assessment Reports, Success Stories, and Waste Minimization Database

#### COMMENT

The IEMP implementation period did not allow for extended monitoring. DENR should continue to monitor volunteer firms using SA procedures to determine the extent that the PMA process is being institutionalized by these firms.

IEMP also used SA methodology to assess impact indicators and measure progress in achieving USAID's Results Package 3 objectives and to provide input data for the IEMP waste minimization database. Most importantly, SA is an essential tool for DENR to monitor the progress of firms committed to reducing waste to meet compliance standards. Results can be directly entered into the PMA PMS database. At the conclusion of SA activities in December 1996, 135

of the 143 PMA firms had been assessed for progress in implementing waste minimization options and the results included in the IEMP databases.

#### 4.2.8 Waste Minimization Database

Throughout the project, IEMP accumulated numerous data from its 143 volunteer firms. To manage this data IEMP developed a data management system consisting of 3 major databases: (1) a PMA database for all volunteer firms' baseline and background information, directory, production data, and wastewater and BOD generation data; (2) a PMA performance monitoring database for all the waste minimization options recommended to the 143 volunteer firms and their corresponding financial and waste reduction data; and (3) a waste database listing all wastes generated by volunteer firms and how

these wastes were managed. Volume 4 of the PMA Guideline series provides detailed methodology on management and maintenance of IEMP databases.

Recognizing the immense usefulness of the databases, IEMP developed two information systems: the PMA Performance Monitoring System (PMS) and the Pollution Reduction and Environmental Management Information System (PREMIS).

The PMA PMS, intended for DENR use only, is basically a data entry system allowing users to update waste minimization data as a result of PMA monitoring. This system was designed in line with the goal of having the regional DENR staff continue to monitor PMA participating firms upon completion of IEMP.

PREMIS, designed for a broad spectrum of users, is a searchable database that allows users to search for any waste reduction technologies documented by IEMP. PREMIS contains data on production, waste streams, waste reduction options, and corresponding waste minimization implementation costs and benefits. PREMIS was reproduced on PC diskettes for initial distribution to DENR regional offices. As PREMIS is refined through a testing period, it can be distributed to IEMP volunteer firms and industrial and professional associations.

DENR should plan to use the PMA PMS as a first-phase database that can be updated and expanded with data from other projects, such as MEIP, ASEAN-EIP, PRRP, and any IEMP follow-on project. The PREMIS on the other hand can be used by DENR as a marketing tool to influence other industries to implement waste minimization program, and by industries as a source of information on waste minimization technologies and benefits.

#### 4.2.9 Characterizing Philippine Industry

A very recent development occurring at the end of the project and one of the most significant outputs of the PRI component is the characterization of a number of industry subsectors in terms of operating efficiency by calculation of pollution load factors, or PLF. This is original data not previously available and will be a valuable asset for designing fee structures for a national pollution charge system. Additionally, industry-wide PLFs can be used by individual firms and industry associations to

#### QUICK SUMMARY

##### OBJECTIVE 1:

Institutionalize PMA monitoring at the DENR

##### OBJECTIVE 2:

Provide database of information for technology transfer

##### ACTIVITY:

Compile database of waste minimization options

##### OUTPUTS:

PMA Performance Monitoring System (PMA PMS) and Pollution Reduction and Environmental Management Information System (PREMIS)  
Windows-compatible searchable database

monitor efficiency and for comparative analysis when undertaking improvement programs to modernize equipment to improve productivity and reduce waste generation.

A separate report on PLFs has been provided to USAID and DENR/EMB and will not be discussed in detail in this report. Volume 4 of the Pollution Management Appraisal Guidelines does provide the methodology used by IEMP to calculate PLFs. The following industry subsectors have been characterized according to PLF (note that PLFs cannot be compared across subsectors).

Industry Subsector	Pollution Load Factor (PLF)
Sugar Milling and Refining	45 kg BOD/MT raw sugar
Desiccated Coconut	99.2 kg BOD/MT DCN
Tuna Canning	63.3 kg BOD/MT tuna product
Coconut Oil Refining	8.66 kg BOD/MT refined coconut oil
Oleochemicals	
- Fatty alcohol	18 kg BOD/MT fatty alcohol
- Methyl ester	32.5 kg BOD/MT methyl ester
Carrageenan Processing	46 kg BOD/MT carrageenan
Alcohol Distillery	890 kg BOD/m <sup>3</sup> alcohol

### 4.3 POLICY STUDIES AND PUBLIC/PRIVATE DIALOGUES

IEMP provided support to DENR for extensive and comprehensive policy analysis focusing on strengthening existing command and regulatory controls and on introducing market-based incentives to promote compliance with environmental regulations and standards. Approximately 28 percent of IEMP's resources were expended on policy studies and supporting public and private dialogues and a number of special activities. The following Quick Summary highlights the major outputs of this project component.

IEMP policy studies have had and will continue to have a major impact on environmental policy reform in the Philippines. Implementation of policy action plans has been slower than anticipated; however, considerable progress has been made. IEMP policy studies have also had an impact on other DENR projects as will be noted in the following discussion. Policy study recommendations and implementation progress are discussed in this section. Recommended follow on implementation activities based on the policy action plans are discussed in Section 6.

### 4.3.1 Policy Studies

#### Policy Study No. 1: Financial Resources to Fund Environmental Investments

This study, completed in December 1993, recommended increased investments in high priority industries identified by NRIPS to promote investments in pollution prevention and common treatment facilities. Recommendations included industry specific incentives or subsidies, technical assistance, reforms in financial institutions' perceptions of "environmental projects," and the development or setting up of a clean fund.

This policy study also provided a format for financial analysis of waste minimization options recommended to IEMP volunteer firms. IEMP published a *Handbook on Financing Environmental Investments*, for financial managers and its *Quick Reference Guide* intended for technical staff to aid in the simple application of economic variables to calculate the financial feasibility of waste minimization options.

#### Policy Study No. 2: Proposed Standards for Characterization and Registration of Hazardous Wastes Under RA 6969

This policy study led directly to an IEMP spin-off project funded by USAID for implementation of the RA 6969 action plan. Basic recommendations included the development of methods for review and prioritization of hazardous waste registration forms; a database for compiling registration data; regulations for facilities that treat, store, dispose, or transport hazardous waste; a comprehensive enforcement policy; and a facilities inspection process linked to IEMP workshops for compliance monitoring.

QUICK SUMMARY	
<b>POLICY STUDIES</b>	
PS 1:	Financial Resources to Fund Environmental Investments
PS 2:	Proposed Standards for Characterization and Registration of Hazardous Waste Under RA 6969
PS 3, 4, 5:	Market-Based Instruments to Promote Pollution Reduction in the Philippines
PS 8:	Environmental Risk Assessment and Pollution Reduction Planning in the Philippine Environmental Impact Statement (EIS) System
PS 9:	Case Studies in Decentralized Environmental Management
PS 2/10:	Analysis of Current Regulatory Programs for Pollution Management
<b>DEPARTMENT ADMINISTRATIVE ORDERS</b>	
DAO 17:	Industries' participation in PMAs
DAO 29:	Importation of recyclable materials containing hazardous substances
DAO 11:	EIA programmatic compliance
DAO 96-37:	Improvement of EIA implementation

COMMENT
In partnership with DENR in promoting environmentally sound project development, the Land Bank of the Philippines (LBP) and the Development Bank of the Philippines (DBP) now target small- and medium-sized enterprises for concessionaire loan rates for the environmental components of projects that reduce or eliminate waste generation.

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**Policy Study No. 3,4,5: Market-Based Instruments (MBI) to Promote Pollution Reduction in the Philippines**

The action plan of this study reviewed the merits of six ranked market-based instruments: financial incentives, markets for waste, user fees, pollution charge, risk and liability, and deposit-return systems. This policy study formed the basis for the present implementation of a pollution charge or user fee system by the Laguna Lake Development Authority (LLDA), which is considered a prototype for a national system to be implemented by DENR.

**IMPLEMENTING ACTIVITIES**

IEMP assisted LLDA during the first IEMP project extension selected activities leading to the implementation of the user fees system. The successful implementation of the LLDA user fees system can be attributed to a multi-agency, multi-project collaboration among DENR, LLDA, IEMP (USAID), and MEIP (the World Bank). Also, the IEMSD project has complemented PS 3,4,5 by conducting a study on MBIs for air and water pollution control, and for the use of MBIs in the agricultural sector.

**Policy Study No. 8: Environmental Risk Assessment and Pollution Reduction Planning in the Philippine EIS System**

This policy study made recommendations on unburdening and strengthening the EIS System and has influenced follow-on work by IEMP and other projects. IEMP prepared DAO 11 on EIS Programmatic Compliance, developed the Philippine EIS System Guide: Policies and Procedures manual and drafted guidelines on social acceptability. IEMP also conducted numerous EIA workshops for public and private sector participants to promote basic understanding of EIA and the EIS System.

**IMPLEMENTING ACTIVITIES**

DAO 11 led directly to a second IEMP spin-off project, the Environmental Impact Statement Programmatic Compliance (EISPC) Project. At the request of DENR, IEMP pilot-tested ecoprofiling guidelines developed by the EISPC project as part of the first IEMP project extension.

IEMP assisted in developing DAO 96-37 that strengthens the EIS system and in conducting information dissemination campaign about DAO 96-37 through seminars and information materials. IEMP also revised the EIA Handbook to come up with an EIA Technical Manual.

*In addition, the IEMSD EIA program was basically patterned after the results and recommendations of PS 8. Revisions to the Philippine Environmental Code also considered major recommendations of PS 8.*

**Policy Study No. 9: Case Studies in Decentralized Environmental Management**

This policy study is one of DENR's main resources for addressing decentralization and devolution issues of environmental management functions. It recommended strategies for clarifying and resolving policy issues such as conflicting statutes, and political and administrative authorities. It also recommended DENR management diagnostic and training programs, and organizational development training for LGUs in strengthening environmental protection and management through decentralization or devolution. While no specific DENR initiative to implement the policy recommendations has taken place, the policy study has assisted the Local Development Assistance

Project (LDAP) and Governance on Local Democracy (GOLD) projects by providing an institutional framework on devolved environmental functions.

### **Policy Study No. 2/10: Analysis of Current Regulatory Programs for Pollution Management**

Policy Study 2/10 may be the most comprehensive and complete analysis of present environmental regulatory programs yet undertaken by DENR. Key recommendations of this policy study are to: (1) increase sanctions and provide stricter enforcement of pollution control laws; (2) strengthen environmental programs according to their objectives; (3) reaffirm DENR primacy in pollution management; and (4) broaden application, but limit coverage for financial responsibility and Environmental Guarantee Fund (EGF) contributions. A detailed Action Plan in three phases (near-, mid-, and long- term) has not been implemented to any significant degree, however the Action Plan provides a clear road map from which to proceed.

#### **IMPLEMENTING ACTIVITIES**

IEMP provided extensive assistance to House Committee on Ecology with PS 2/10 recommendations on fines and penalties and improvements to the EIS System.

IEMP, as part of the first project extension, conducted baseline classification studies of two bays associated with the Coastal Resource Management Project (CRMP), and completed the ecoprofile of the PHIVIDEC industrial estate, both part of the Action Plan.

### **4.3.2 Public and Private Dialogues**

Public participation in the formulation of policy reforms has been a key component of IEMP. Eleven dialogues were conducted over the life of the project and were used extensively for public debates on policy reforms, revising the environmental code, and strengthening the EIS System. Dialogues as core project activities and as special activities are shown in the following Quick Summary.

### **4.4 CAPABILITY BUILDING**

The goal of the IEMP training component was to increase the environmental management capacity of Philippine industry, government, and NGOs to ensure that the benefits of IEMP would be sustained beyond the life of the

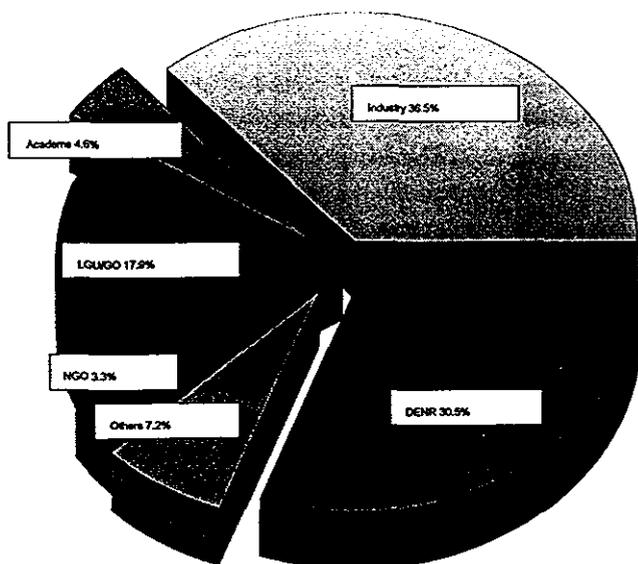
#### **QUICK SUMMARY**

##### **CORE PROJECT ACTIVITIES**

- PPD 1: Policy Study Inter-governmental Dialogue
- PPD 2, 3, and 4: Programmatic Compliance in the EIS System
- PPD 5: Market-based Instruments
- PPD 6: Social Acceptability within the EIS System (5 regional sessions)
- PPD 7: Fines and Penalties

##### **SPECIAL ACTIVITIES**

- Two PPDs related to revising the Philippine Environmental Code
- Four PPDs related to revising the EIS System DAO 21



**FIGURE 4-1. PARTICIPANTS TRAINED BY AFFILIATION**

project. Approximately 42 percent of project resources were expended on capability building. Training output objectives for each training module in terms of the number of participants to be trained and the number of participants actually trained are noted in the following Quick Summary. Figure 4-1 shows a breakdown of participants by affiliation for the training program. This figure does not include participants of other special workshops and trainings conducted by IEMP upon DENR and EMB's request, particularly those workshops on RA 6969 and EIS system implementation conducted during project extensions. Appendix H lists the workshops conducted by IEMP.

QUICK SUMMARY		
EXPECTED AND ACTUAL OUTPUTS	TARGET	ACTUAL
<b>1. Training to Strengthen Technical Capacity</b>		
Pollution Management Appraisal	200	988
Environmental Risk Assessment	60	140
Data Collection, Sampling, Sampling Analysis	300	200
<b>2. Training to Strengthen Environmental Management Capacity</b>		
Environmental Impact Assessment	700	771
Compliance Audit	200	225
Compliance Monitoring	200	278
DELIVERABLES: Participant and Trainers Manuals for each training program; Alumni List of all training program participants		

IEMP training programs achieved two fundamental objectives. First, these have created a pool of qualified experts in pollution management, and second, these have increased the public sector capacity for environmental management. A list of IEMP local trainers is attached as Appendix I. Early in the project, PRC EMI developed close counterpart relationships with qualified host country experts as IEMP partners in project implementation. The objective was to promote technology transfer to

eventually reduce and eliminate the need for U.S.-based training consultants. Additionally, training programs were "Philippine-ized" as quickly as possible using Philippine case studies and actual experience to increase the relevancy of the training experience. Comprehensive participants' and trainers' manuals were developed for each training program, which were modified after each workshop to take into account participants' comments and to ensure that training modules were focused on actual Philippine concerns.

In this section, we present an overview of training methodology and briefly discuss the training needs assessment conducted midway through the project.

#### 4.4.1 Training Methodology

The following is a brief overview of the training methodology as modified in July 1993 to be more responsive to DENR concerns and ensure that project outputs would be achieved.

**Environmental Risk Assessment:** The initial ERA workshop conducted in February 1993 focused on macro ERA and on the development of the NRIPS system. Evaluations received from the first workshop indicated that Filipino professionals were interested in learning more about micro ERA and subsequent ERA workshops were focused on micro ERA and its concepts. The course length was shortened to 4 days, which included 1 day for macro ERA and 3 days for micro ERA.

#### COMMENT

All ERA workshops had a U.S.-based workshop leader supported by local experts. In accordance with the recommendations of the project evaluation team and EMB, no ERA courses were conducted after September 1994 since at that time DENR had not determined the directions for ERA implementation. Elements of ERA were, however, incorporated into EIA training.

**Environmental Impact Assessment:** EIA training was the most heavily attended (other than PMA training) workshop. The training strategy formulated by IEMP and EMB included: (1) regional training focused on DENR regional staff, LGUs, NGOs, and the private sector; (2) development of EIA guidance documents; and (3) EIA consultations for industries. Depending on the participant mix, each workshop was divided into two or three training sessions; one for government, one for industry, and one for NGOs, with subject emphasis tailored to each specific group. IEMP also developed training materials that included the EIA training manual, an EIA primer, and the EIS System Guide. IEMP-sponsored EIA consultations with private sector firms were not conducted. However, IEMP staff and consultants did provide assistance to EMB for review of backlogged EISs.

#### COMMENT

The last 5 EIA workshops were conducted by all-Filipino training teams. The expected project output was exceeded with demand for additional training, especially from the public sector, still unfulfilled.

**Data Collection, Sampling, and Sampling Analysis:** The first workshop was conducted in Cebu City using the University of San Carlos laboratory, but all subsequent workshops were conducted in Manila and used the EMB laboratory because of its complete facilities for environmental analysis. In order to support training activities, EMB requested and USAID approved procurement of basic sampling instruments and laboratory supplies needed to conduct the training. The instruments remained with the EMB laboratory after training. Of the 200 participants trained, approximately 20 percent were from the private sector. The expected output of 300 was not achieved because not enough qualified participants could be identified in the public sector (from DENR, LGUs, and NGOs).

**COMMENT**

A common and recurring theme among DENR participants was the lack of laboratory and field testing equipment to practice what had been learned.

The last two DCSSA workshops were conducted by all-Filipino training teams.

**Compliance Monitoring and Compliance Audit:** The training methodology remained essentially as planned at the beginning of the project. Compliance monitoring workshop was designed for government, particularly DENR, while compliance audit workshop was for industry. The compliance monitoring protocols for air, water, and hazardous waste have helped DENR to establish uniformity in assessing compliance with emission standards. For compliance audits, the number and frequency of workshops were increased in 1995 to respond to the increase in demand from the private sector.

**COMMENT**

The 4th, 5th, and 6th CA workshops were conducted entirely by Filipino trainers, as were the 6th and 7th CM workshops.

**Pollution Management Appraisal Workshops:** Participation by IEMP subcontractor and independent consultants in PMA workshops and on-site appraisals was one of the most successful technology transfer achievements of the project. Over 30 host country consultants participated in workshops and in on-site appraisals. Several of these consultants have also provided similar services to Philippine industry as part of ISO 14000 training or for firms who have heard of IEMP success stories and want to improve their compliance record.

**COMMENT**

Of the 24 PMA workshops conducted by IEMP, the last 12 were conducted by all-Filipino training teams. As DENR enforcement of environmental standards increases, the demand for these services will also increase.

#### 4.4.2 Assessment of Training Needs

The project evaluation team noted the lack of a project training strategy to identify training needs, prioritize participation, and select participants. Project training objectives as reflected in the Project

Paper were being met without the assurance that the needs of the public and private sector were being addressed.

A training needs assessment was conducted by IEMP in late 1994 to early 1995 to (1) determine regional training needs and priorities; (2) identify participants for each training program; and (3) revise training schedules where appropriate to better meet demand. The needs assessment covered both the public and private sectors; however, the response from the private sector was limited.

IEMP conducted surveys and interviews with workshop participants, DENR Regional Technical Directors and Environmental Quality Division Chiefs, and selected industry and professional associations and universities and private institutions. IEMP wanted to assess the training needs of LGUs that have full-time environmental officers or staff and NGOs that have working arrangements with LGUs for their environmental management programs; however, due to resource and time limitations, assessment was not expanded to cover these areas. The findings and the actions taken by IEMP as a result of the needs assessment can be briefly summarized as follows:

- ◆ DENR regional offices were the major source of nominees for public and private sector participants (industry and professional associations were not surveyed directly)
- ◆ Nominees were identified by name and affiliation for specific training programs
- ◆ Nominees were screened for qualifications for each workshop and for attendance at other IEMP workshops
- ◆ The needs assessment indicated more demand than could be met with project resources, especially for EIA and CA
- ◆ IEMP increased private sector cross-training in DCSSA and EIA, and public sector cross-training in PMA for NGOs and LGUs
- ◆ IEMP increased the number of planned EIA and CA workshops to accommodate identified demand

IEMP training schedules for 1995 and 1996 were based on the needs assessment results.

#### **4.5 SPECIAL ACTIVITIES**

The special activities fund (SAF) was established by USAID as a funding source for implementation activities in support of the three project components. The SAF was also used to fund activities outside the project scope of work that contributed to project objectives and increased its impact. The SAF thus provided the funding for labor; travel and logistic support for workshops, dialogues, PMAs,

and seminars; training materials; as well for special request for support made by DENR or EMB. Appendix J is a list of special activities conducted by IEMP that were not considered as core project activities.

One of the implementation success stories was the flexibility of the IEMP team and the rapid response by USAID for acting upon requests by DENR or EMB for assistance not included in the project scope of work. The willingness and ability to respond can clearly be seen in the support IEMP provided in revising the EIS System and supporting the House Ecology Committee by sponsoring dialogues to debate reform in the Philippine Environmental Code. The ability and willingness of the IEMP staff, PRC EMI US-based consultants, independent host country consultants, and the IEMP subcontractors to react on short notice at critical times during project implementation is good example of the teamwork that was evident throughout implementation.

#### **4.6 PROJECT EXTENSIONS**

Two no-cost project extensions were requested by DENR and approved by USAID. The first extension was for 5 months to February 28, 1997, and the second for an additional 4 months to June 30, 1997. These project extension activities provided support to DENR in its 4 major programs: EIS System strengthening; RA 6969 implementation; PMA institutionalization; and intensified Information, Education, and Communication (IEC) program. IEMP output during the extension are listed in Appendix K.

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## 5.0 PERFORMANCE MONITORING AND IMPACT INDICATORS

In December 1993, PRC EMI conducted intensive literature review and selective interviews of key officials of the EMB, DENR Regional Offices, IEMP staff, and representatives of target industries and trade associations. The resulting report provided a baseline summary document and described a monitoring program that will facilitate the evaluation of IEMP performance and the assessment of its impact at the end of the project.

During IEMP implementation, PRC EMI used the recommended performance monitoring and impact assessment indicators as guide, together with the IEMP Project Paper Logical Framework, and the USAID Results Package No. 3.

Since the impact indicators are critical to evaluating project performance and for determining the sustainability of IEMP benefits, they are reviewed in some detail in this section. Whenever necessary, PRC EMI provided some comments of how IEMP was able to answer or to act on these indicators. For a detailed discussion the referenced report should be consulted<sup>1</sup>.

Two impact indicators have been identified to measure the project impact at goal level. They include: increase in profit base and financial strength of participating facilities as a result of adoption of pollution prevention and control measures; and reduction in waste generated by participating facilities.

### 5.1 IMPACT ASSESSMENT AT GOAL, PURPOSE, AND OUTPUT LEVELS

The model PRC EMI proposed for monitoring and impact assessment is three-tiered:

- ◆ Progress and performance monitoring during the implementation process
- ◆ Performance assessment at output level at the end of the project (EOP)
- ◆ Impact assessment at goal, purpose, and output levels at the EOP.

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<sup>1</sup>PERFORMANCE MONITORING AND IMPACT ASSESSMENT, Industrial Environmental Management Project, PRC Environmental Management, Inc., December 1993

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The model was structured on IEMP inputs and the anticipated outputs and impacts at three levels: (1) goal level; (2) purpose level; and (3) output level. PRC EMI recommended measurable indicators for each of the following parameters, and several relevant and measurable indicators were identified:

- ◆ **Propensity for change.** In projects similar to IEMP, the most accepted and relevant parameter used to measure institutional impact is the project's effects on bringing about "behavioral change" that require complex social and economic surveys and studies. However, the recommended indicators in the following tables can be used to evaluate and assess the evidence of and tendencies to change in the target institutions.
- ◆ **Infusion of capital.** This parameter measures the impact of IEMP on increased capacity of target industries and institutions, primarily EMB, in pollution control, monitoring, and enforcement. The indicators include both human and financial capital.
- ◆ **Acquisition of Technology.** Abatement of industrial pollution through application of pollution prevention and control requires access to, and acquisition and adoption of, tested technologies. The impact of IEMP can be assessed through a number of indicators that measure the extent of pollution prevention and control technologies acquired or adopted by the target industries.

These impact indicators, together with the PP Logical Framework and USAID/Manila Mission's Results Package 3 indicators were used by PRC EMI to monitor and assess IEMP's impact.

## 5.2 GOAL LEVEL INDICATORS

According to the PP Logical Framework, an estimated 2 to 5 percent increase in regional output per capita and an estimated 2 to 5 percent decrease in industrial absenteeism among employees in geographic areas where PMAs were conducted will be indicative of achievements of the IEMP goals. PRC EMI recommended against assessing the extent to which the project goal had been achieved on the basis of those parameters for the following reasons:

- ◆ Special surveys and models would be required for any quantitative and acute assessment of the impact of IEMP in increased regional income and decrease in industrial absenteeism.
- ◆ IEMP activities were not centered in well-defined and confined geographic areas. The impact of the project will be dispersed throughout the priority regions.

- ◆ The duration of IEMP and resources were limited, and it is unrealistic to anticipate significant and measurable changes in social and economic well-being of communities in such large areas within a short time frame.

PRC EMI recommended project impact at the goal level be assessed qualitatively on the basis of the results of measurements of the following two indicators, each one of which was quantified through methodologies developed for IEMP implementation:

- ◆ **Impact Indicator # 1: Increase in profit base and financial strength of the participating facilities as a result of adoption of pollution prevention and control measures.** This indicator is practical and measurable for evaluating goal level impact. IEMP's PMA Monitoring System (PMS) has analyzed increased benefits in terms of profits or savings of all PMA volunteer firms that have implemented capital intensive waste minimization opportunities. This is an indication of the project's impact in increasing the financial health of volunteer firms and consequently the economic growth in areas where they are located.
- ◆ **Impact Indicator # 2: Reduction in waste generated by the participating facilities.** This indicator measures reduction in waste as an approximation of the impact of the project on health risk in the communities around or downstream from target industries. IEMP's database has documented reduced BOD generation for each volunteer firm.

Table 5-1 shows the recommended impact indicators and verification methodology:

Category: Goal	Impact Indicators	Verification
Economic growth	1. Increase in savings or profits in target industries as a result of adoption of pollution prevention and control measures	1. Review of PMA reports 2. Performance of cost-benefit analysis of a sample facility in each industry category
Increase in employment		
Reduction in health risk	2. Reduction in waste generated by the participating facilities	1. Review of EMB/DENR files 2. Review of PMA reports 3. Conduct of waste accounting in a sample facility in each industry category

**TABLE 5-1. GOAL LEVEL IMPACT INDICATORS**

Industry Subsector	No. of PMA Firms	Capital Investments ₪	Annual Net Benefits ₪	Water Use Reduction m <sup>3</sup> /yr	Annual Pollution Load Reduction	Percent PLR
Tuna Canning and Seafood Processing	12	28,988,510	57,831,389	435,179	1,009,803	28
Desiccated Coconut Manufacturing	10	4,463,760	30,976,182	209,784	1,377,579	15
Pulp and Paper Mill	4	26,238,720	16,840,338	2,671,485	317,259	9
Coconut Oil Milling and Refining	9	7,328,107	14,720,505	1,021,715	146,337	25
Sugar Milling	15	61,597,428	54,706,624	28,320,592	29,878,521	44
Distilled Spirits	4	82,378,903	12,228,617	470,839	1,397,909	6
Starch Manufacturing	4	3,168,333	218,826,820	623,507	3,201,633	27
Seaweed Processing	6	12,712,503	42,465,558	321,683	51,900	8
Fruit Canning	8	10,442,330	2,707,325	707,532	1,710,322	20
Hog Raising	16	23,674,190	23,811,185	191,568	334,361	22
Chicken Raising	2					
Industrial Chemicals	4	457,330	9,916,881	69,072	363,000	30
Slaughtering	8	540,630	2,566,302	224,374	156,286	27
Wood Products	1	56,788	74,289	413,230	1,754,730	28
Softdrinks	2	5,037,200	5,959,298	166,856	140	12
Tanneries	2	673,801	274,119	4,395	4,703	5
Metal Finishing	7	5,383,340	9,387,204	57,405	NA	NA
Manufacture of Synthetic Resins	2	751,558	1,641,780	31,511	NA	NA
Cement Manufacturing	2	381,948,480	276,190,000	no data	NA	NA
Others	6	18,803,183	45,509,132	982,497	1,765,475	6
Totals	135	674,645,094	826,633,548	36,923,224	43,469,958	29
Totals \$		26,985,803.8	33,061,741.92			

**TABLE 5-2. SUMMARY OF PMA BENEFITS BY INDUSTRY SUB-SECTOR  
(AS OF DECEMBER 31, 1996)**

## 5.2 PURPOSE LEVEL INDICATORS

The PP Logical Framework established the following conditions as indications of the project's achievement at the purpose level: adoption of pollution prevention measures by 50 percent of firms that received PMAs, a 5 to 10 percent reduction in production costs at participating firms, and a 5 to 10 percent decrease in pollution at participating firms. PRC EMI proposed to broaden the conditions and include indicators for propensity for change, capital infusion, and acquisition of technology. Table 5-3 presents these three parameters and associated indicators.

IEMP has not directly measured all proposed indicators, and for some indicators, it would not have been practical to do so because of restraints on time, project resources, or insufficient time for impacts to develop. However, we recommend these indicators to remain for other following projects. We have commented, where appropriate, on some indicators with regard to their status at the close of the project.

Category: Purpose	Impact Indicator	Verification
Pollution reduction and prevention; increased investments by target firms in pollution control; reclamation of industrial waste and adoption of cost-effective pollution abatement technologies; increase in institutional capability in policy and regulatory matters regarding pollution management	<b>Propensity for Change</b> 1. Number of firms that voluntarily expressed interest in PMAs	Review of EMB and IEMP administrative records
	2. Ratio of firms that have implemented low-cost pollution prevention and control measures	Review of PMA reports and site visits to sample facilities
	3. Ratio of firms that have developed bankable pollution management packages for acquisition of credit	Review of PMA database and reports and interviews with sample facilities and lending agencies
	4. Number of policy guidance, incentive options, and regulations adopted by GOP to promote pollution reduction or deter violations	Review of policy studies, EMB administrative records, and IEMP databases and interviews with industry and lending agency representatives
	5. Quantifiable increase in enforcement responses and compliance rates by target industries	Review of EMB administrative records and rapid survey of enforcement responses imposed by PAB and implemented by regional offices

TABLE 5-3. PURPOSE LEVEL IMPACT INDICATORS

Category: Purpose	Impact Indicator	Verification
Pollution reduction and prevention; increased investments by target firms in pollution control; reclamation of industrial waste and adoption cost-effective pollution abatement technologies; and increase in institutional capability in policy and regulatory matters regarding pollution management	<b>Capital Infusion</b>	
	1. Quantifiable increase in GOP and international agencies budget in pollution prevention and control	Review of EMB budget and interviews with division heads of EMB and DENR and funding agencies
	2. Quantifiable increase in GOP work force in industrial environmental management, monitoring, and enforcement	Interview with various divisions of EMB and review of the baseline information on EMB staffing
	3. Increase in private sector investment in pollution prevention and control	Review of IEMP administrative records and interviews with industry and lending agency representatives
	<b>Acquisition of Technology</b>	
	1. Number of firms that have implemented pollution prevention and control measures	Review of EMB administrative records and IEMP PMS
2. Development for pollution prevention technology documentation by EMB, target industries, and other institutions	Review of training manuals, pollution management guides, EMB databases, databases at other institutions, and links with international databases	
3. Increased incorporation of pollution prevention technologies and measures into the environmental requirements	Review of EMB administrative orders and records and interview with Environmental Quality Division of EMB	

**TABLE 5-3. PURPOSE LEVEL IMPACT INDICATORS (CONTINUED)**

Impact Indicators Pertaining to Propensity for Change: Five indicators were identified to assess the propensity for change resulting from activities initiated under IEMP.

- ◆ **Impact Indicator #1:** Number of firms that voluntarily expressed interest in PMAs. This indicator will provide a general indication of the impact of the project's media campaign and the multiplier effects of PMA initiatives to encourage voluntary compliance with environmental requirements and create interest among target industries.
- ◆ **Impact Indicator # 2:** Ratio of firms that have implemented low-cost pollution prevention and control measures. This indicator will show IEMP's direct impact on behavioral change in participating firms. The measurement will be verified through follow-up surveys and assessments of PMA volunteer firms and will be incorporated into the IEMP database.
- ◆ **Impact Indicator # 3:** Ratio of firms that have developed bankable pollution prevention and control packages for credit acquisition. This indicator will measure the extent of IEMP's impact in packaging pollution prevention and control options for credit acquisition. The measurement will be the ratio between the firms that developed bankable plans and

**COMMENTS**

The multiplier effect of the project may not have been fully demonstrated by the IEMP record keeping and survey methodology. The following is a brief summary of what has been recorded, and the quality and quantity of the data collected:

- Firms attending industrial seminars: extensive records and database
- ▶ Firms volunteering for a PMA: extensive records and database
- ▶ Firms expressing interest in a PMA, or "walk-in" requests that IEMP screened for priority in subsector and region: incomplete records not routinely maintained
- ▶ Firms attending PMA workshops but not volunteering for a PMA: extensive records and database; a mail-in survey was conducted with limited but encouraging response
- ▶ Firms attending Rapid PMAs (RPMA) in non-priority regions and non-priority industrial subsectors: complete records maintained but not included in database

**COMMENTS**

- 1) The results of the survey and assessment were incorporated into the database.
- 2) Survey and assessments showed many facility initiated waste minimization options not included in the PMA report indicating sustainability of the PMA.

**COMMENTS**

The definition of "bankable" PMA should also include firms unassisted by IEMP. IEMP did not actually assist any volunteer firms in securing financing for a bankable PMA following the completion of the PMA report and its presentation to management. Firms either financed capital intensive waste minimization options from internal resources or were successful on their own in capital acquisition without the assistance of IEMP. The level of investments made by volunteer firms (over \$25 million) is a clear indication of IEMP's impact on credit acquisition and the quality and feasibility of the capital intensive options identified in PMA reports.

packages for implementation of PMA recommendations and the total number of firms that received PMAs.

- ◆ **Impact Indicator # 4: Number and extent of policy guidance, incentive options, and regulations conducive to promotion of pollution prevention and control adopted by GOP.** This indicator will show the propensity of GOP environmental and legislative institutions to adopt incentive options and enforcement sanctions to promote compliance with environmental requirements. The results of IEMP's policy studies are a number of policy recommendations and action plans, and adoption by regulatory and legislative authorities will be a strong indication of institutional behavioral change.

**COMMENTS**

IEMP's involvement in assisting and advising the Philippine House Ecology Committee in revising the Philippine Environmental Code (House Bill No. 4) and in researching and drafting Executive Orders and Department Administrative Orders, are examples of institutional change affecting environmental management.

- ◆ **Impact Indicator # 5: Quantitative increase in enforcement responses or compliance rate.** This indicator will show the extent of IEMP's impact on strengthening DENR's institutional capacity to respond to noncompliance, and will be indicative of the propensity of institutions to enforce existing or new environmental requirements.

**COMMENTS**

IEMP did not attempt to measure increased enforcement as a response to IEMP initiatives. A recent Asian Development Bank Technical Assistance Project (March 1997) will assist EMB in upgrading its compliance monitoring activity through a Computerized Permitting Administration System (CPAS).

**Impact Indicators Pertaining to Infusion of Capital:** An important factor in assessing the sustainability of IEMP activities is the ability of DENR and EMB to acquire and infuse adequate human and financial capital to ensure the continuity of project initiatives. It is also important to assess private sector investments on pollution prevention and control. Capital infusion includes both increased capacity in trained human resources and increased financial resources.

- ◆ **Impact Indicator # 1: Quantitative increase in capital investment by GOP and international agencies in industrial pollution control.** Success in sustaining IEMP benefits depends largely on the capacity of EMB to function at increased levels of efficiency and responsibility. The financial resources of EMB, and consequently those of the regional offices involved in industrial pollution control, could be strengthened through two sources of financial support. The GOP general treasury and resources made available through regional and international funding and lending agencies, such as the World Bank, ADB, EEC, and bilateral agreements with USAID, and other agencies.

- ◆ **Impact Indicator # 2.** Quantifiable increase in GOP's human resources skilled in industrial environmental management, monitoring, and enforcement. IEMP has invested significant resources to provide training in key areas. This quantitative effort is expected to result in a qualitative change in the performance of EMB and regional offices in such areas as compliance monitoring, EIA evaluation, PMA monitoring, risk assessment, and establishment of industrial priorities.

**COMMENTS**

IEMP prepared an extensive training database (Alumni List) of all public and private sector participants, their affiliation, position, and attendance at IEMP training workshops. This is a major resource document that DENR/EMB can use to identify trained personnel that may be used for LGU's follow-on training . Approximately 1,200 DENR/EMB employees and 600 employees from LGU benefited from IEMP training programs.

- ◆ **Impact Indicator # 3:** Increased private sector investment in environmental pollution control. This indicator will measure changes in the status of private sector investment in waste minimization and pollution control and, more specifically, changes in the availability of credit for industries that are interested in upgrading processing equipment and pollution control technologies.

**COMMENTS**

LBP and DBP offer reduced interest rates for industrial projects that demonstrate clean technology and pollution control as design considerations. Environmental Units established at each bank evaluate loan applications for their environmental considerations in order to qualify for preferential loans. Competition for these funds for capital projects is growing and both banks anticipate additional lines of credit to meet the demand.

**Impact Indicators Pertaining to Acquisition of Technology:** Two types of indicators pertain to acquisition of technology:

- ◆ **Impact Indicator # 1:** Number of firms that have implemented pollution prevention and control technologies and practices. This indicator measures the adoption of pollution prevention technologies as a direct result of project initiatives, and assesses the type of technologies adopted and the extent to which participating firms adopted them.

**COMMENTS**

IEMP's PREMIS and PMA PMS database has information on technologies adopted by volunteer firms, and the resulting reduction in BOD generation.

- ◆ **Impact Indicator # 2: Development and use of documentation of pollution prevention technology by EMB and target industries.**

Development and use of IEMP's training manuals and publications can be considered an IEMP impact due to its contribution to increased information sources on pollution prevention. These include various technical guidelines such as PMA reports, industry-specific pollution management guidelines, training manuals, newsletters, and technology databases and links with international pollution prevention databases.

**COMMENTS**

The distribution of these products, such as training manuals and pollution management guidelines and databases are discussed elsewhere in this report, but usage in the public or private sector has not been measured.

- ◆ **Impact Indicator # 3: Increased incorporation of pollution prevention technologies and measures into environmental requirements. A key success indicator of IEMP will be its impact on incorporating pollution prevention and waste minimization concepts and approaches into the environmental regulatory process.**

**COMMENTS**

The impact of IEMP policy studies and implementation of action plans were discussed in Section 4. One example is the implementation of the LLDA pollution charge system (now called user fees system) as a direct result of the action plan proposed in Policy Study 3,4,5 on market-based incentives.

### 5.3 PERFORMANCE INDICATORS AT THE OUTPUT LEVEL

The PRC EMI model proposed for performance assessment consists of selected project outputs, the most relevant indicators for measuring the selected outputs, and the method of assessment and verification of the outputs achieved. The PP Logical Framework identified five outputs and the expected magnitude of each, and PRC EMI recommended adding a sixth indicator. Table 5-4 presents a summary of PRC EMI's recommended indicators and the methods for monitoring and verification. USAID and DENR should consider using these indicators in evaluating project performance.

Outputs Categories	Activities Performed	EOP Outputs Anticipated	Performance Indicators	Monitoring and Verification Methods
1. Implementation of National Industrial Priorities based on ERA	Review the total inventory of DENR administrative records and conduct site interviews of selected industries	Five priority industries will be identified through a national risk assessment exercise	ERA implementation checklist and report	1. Acceptance of ERA implementation report by EMB 2. Adoption of ERA report ranking for setting priorities
2. Pollution Management Appraisal	Conduct PMAs at target industries and make pollution control recommendations	150 PMAs completed; 50 percent of the firms that received PMAs will implement PMA recommendations	Number of PMAs conducted	1. IEMP progress reports 2. PMA reports 3. Interview with selected (sample) facilities that received PMA in each industry sector
3. Policy Studies	Conduct policy studies leading to adoption of several policy guidance and regulatory options	10 policy studies completed	Number of policy studies completed	1. Policy study interim and final reports 2. EMB administrative records and orders
4. Capability Building	Conduct workshops in various areas of environmental management, monitoring, and enforcement	1. PMA (17), trained (200) 2. ERA (4), trained (60) 3. DCS (3), trained (300) 4. CA/CM (8), trained(400) 5. EIA (7), trained (700)	1. Number of workshops held 2. Number of participants	1. Workshop evaluation reports 2. Workshops manuals 3. Interview with selected trainees in each area of training 4. Interview with subcontractor consultants who participated in workshop
5. Public and Private Forums	Conduct public and private forums to provide systematic feedback to the policy development processes	Five public and private forums will be held on key industrial environmental management issues	1. Number of forums 2. Composition of participants in each forum	1. Public and private forum workplans 2. Public and private forum reports 3. Interview with randomly selected forum participants at each forum conducted
6. Technology Transfer Initiatives	Provide technical assistance to selected target firms to implement bankable pollution control measure	Not applicable	Number of facilities that have received TA for implemented PMA recommendations	1. PMA follow-up survey and reports 2. Site visit and interview with sample facilities in each target industry sector

**TABLE 5-4. PERFORMANCE INDICATORS (EOP OUTPUTS)**

## 6.0 LESSONS LEARNED AND RECOMMENDATIONS

IEMP was implemented over five years. As its name implies, the project focused on Philippine industries to achieve its goals and objectives by promoting waste minimization. IEMP was successful in promoting the concept of waste minimization by using a marketing strategy that emphasized increased profits resulting from producing and treating less waste. This strategy was successful and produced measurable outputs which exceeded the expectations of the project designers.

During IEMP, two important policy recommendations were implemented by DENR as incentives for Philippine industry to reduce waste generation. They were the enactment of DAO 17 and the pollution charge system (or user fee system) recommended in the PS 3,4,5 Action Plan now being implemented by LLDA. A third government initiative that will have broad implications for *environmental management* when passed into law is the revised Philippine Environmental Code.

IEMP volunteer firms seem to have adopted the concept of waste minimization and the PMA process and there are indications that IEMP benefits are rippling outward through promotion by professional and industrial associations. We are concerned, however, that the limited capacity of DENR may prevent full support of PMA at the regional level, delay effective utilization of the IEMP training programs, and slow policy reform initiatives recommended by policy study action plans.

In this section we propose short term action plans that can be implemented by DENR and EMB with existing resources to promote the sustainability of IEMP benefits and improve the effectiveness of environmental management. Implementation of these recommendations will be a bridge or stepping stone to the longer term policy reforms recommended by the IEMP policy studies.

### 6.1 MEASURING SUSTAINABILITY

With implementation support from IEMP and other environmental projects, DENR is promoting waste minimization as a strategy for industry to meet compliance standards by incorporating market incentives into the regulatory process. These initiatives are beginning to create an industry demand for environmental firms and consultants offering services in waste minimization and the PMA process, environmental audits, hazardous waste management planning, ISO 14000, and other services such as ecoprofiling for programmatic compliance of industrial estates. The opportunities provided by IEMP to Filipino professionals has created a cadre of trained and experienced professionals to meet this growing demand.

The DENR partnership with the development banks, has resulted in integrated programs supported by international lending organizations and donor countries that are creating a market for

environmental investments. Environmental investments are not limited anymore to end-of-the pipe projects. Pollution prevention technologies are beginning to be considered as credit-worthy investments. The concept that environmental projects can produce good return on investments have been proven true by IEMP.

In addition to increased demand for experienced environmental professionals and windows for environmental projects, the following are some indicators showing that the benefits of IEMP are being sustained, or are sustainable, by DENR and the private sector:

#### DENR

- ◆ DENR has considered promoting and monitoring waste minimization programs as a key result area (KRA). Regional offices will include monitoring of PMA volunteer firms in their regular activities and will promote waste minimization through their information, education, communication (IEC) programs.
- ◆ The Pollution Adjudication Board (PAB) will require PMA as one of the conditions for lifting Cease and Desist Order (CDO).
- ◆ The programmatic EIS system requires a PMA for renewal of operating permits.
- ◆ Hazardous waste generators are required by DAO 29 to incorporate the PMA process into their environmental management plans.
- ◆ In 1994 DENR established annual industrial recognition awards for firms that showed significant progress in reducing waste while meeting compliance standards.
- ◆ The proposed Philippine Environmental Code proposes to offer market-based incentives for industries adopting waste minimization programs and to change environmental quality standards basis to load-based instead of concentration-based.

**Laguna Lake Development Authority:** LLDA is pilot testing a load-based pollution charge system (or user fee system) that will reward firms that reduce waste generation with lower fees and penalties. PMA is being promoted as a tool to reduce waste generation.

#### Development Banks

- ◆ The Land Bank of the Philippines (LBP) and the Development Bank of the Philippines (DBP) offer concessionaire rates for industrial projects that demonstrate clean technology and pollution control as design considerations. The LBP Countryside Loan Fund II has a \$100 million line of credit from the World Bank. The DBP has a \$50 million line of credit from the Japanese Overseas Economic Credit

Fund (OECS) through their Environmental Infrastructure Support Credit Program (EISCP). Both programs target small- and medium-sized enterprises (SME).

- ◆ LBP and DBP has established and trained their Environmental Management Units (EMU) on basic environmental management and project evaluation. Trainings were also conducted for accounts and loan officers for both banks and for LBP's participating financial institutions.
- ◆ LBP and DENR have established an EIA Networking System for environmental projects. Under the CLF II applications are screened for compliance with EIA requirements.
- ◆ DBP, with Swedish assistance, has sponsored six industrial subsector environmental management plans (EMP) based on environmental audits which were conducted with the cooperation of the subsector industrial associations. The involved associations have committed to DENR, on behalf of their membership, to implement the EMPs for individual members to reduce pollution generation.

#### **Philippine Industry:**

- ◆ DENR regional offices have reported increased industry demand for environmental services from firms requesting recommendations for qualified consultants who can provide waste minimization training and conduct PMAs.
- ◆ The University of Asia and the Pacific (UAP), Ateneo Center for Continuing Studies, the Development Academy of the Philippines (DAP), the Davao City Chamber of Commerce and Industry, Inc. (DCCCI), and the Pollution Control Association of the Philippines, Inc. (PCAPI) are just some of the associations and organizations that have shown interest in conducting, or are conducting, PMA workshops.
- ◆ The Philippine Sugar Millers Association (PSMA) is conducting PMAs for other sugar milling facilities that were not able to avail of the IEMP assistance.
- ◆ International, national and local conferences on clean technology are always well attended by industries showing growing interest on this program.

## **6.2 ATTITUDES AND PERCEPTIONS ON ENVIRONMENTAL MANAGEMENT AND WASTE MINIMIZATION**

Over the life of the project, IEMP continually polled participants at workshops and industry seminars, and interviewed PMA volunteer firms, industrial and professional associations, and public and private

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institutions to gain an understanding of their attitudes and perceptions on waste minimization and DENR initiatives to improve environmental management and enforce industrial compliance with environmental standards. Industry suggestions to promote waste minimization solicited early in the project confirm project design issues and helped IEMP to improve implementation strategy. Industry was clear on the need to: (1) demonstrate the benefits of pollution prevention by actual case studies of participating Philippine firms; (2) introduce economic incentives and credits to encourage pollution prevention; (3) provide education and training to SMEs; and (4) establish a closer liaison between government agencies and industry associations in formulating environmental policies.

IEMP polls and survey results are briefly summarized in Appendix L. They reflect key issues and concerns, present practices, and opportunities and barriers to waste minimization of the private sector voiced by both private sector and regional DENR officials. They form the baseline consensus for future DENR polls and surveys to gauge policy reform and effectiveness of ongoing programs.

### **6.3 RECOMMENDED FOLLOW-ON ACTIVITIES**

In this section, we recommend a multi-pronged approach to improve environmental management with short term action plans to strengthen environmental management, institutionalize the PMA process, and sustain IEMP's environmental training programs. We believe the suggested action plans are direct and doable with existing DENR resources and with minimum study and no legislative action. The tools are already available from the work of IEMP and other environmental management projects. To be successful, they do require management support and commitment at the highest level with clear directions for implementation.

#### **6.3.1 Strengthening Command-and-Control**

Policy Study 2/10 provides an exhaustive and critical assessment of existing air, water, and waste programs, jurisdictional arrangement among environmental management actors, and developing financial responsibilities. IEMP and DENR have developed several Department Administrative Orders and technical guidelines to implement key recommendations on strengthening command and control, particularly the EIS System, which includes revision of implementing rules and regulations, preparation of policy and procedures guidelines, and implementation of programmatic compliance. IEMP also provided extensive input to the House Committee on Ecology for House Bill No. 4 "An Act Revising the Philippine Environmental Code."

Additional effort and resources from DENR must be provided if the phased implementation schedule of the PS 2/10 Action Plan is to be met. The Action Plan is clear and concise and will not be repeated. However, specific recommendations that can be readily implemented by DENR includes drafting of regulations, publications on communications to inform the regulated community, and policy study analysis. The following recommendations are specific and some are included in the

short-term action plans. Others can be implemented in the mid-or long-term as recommended by the PS 2/10 Action Plan.

#### EIS System

- ◆ Conduct policy analysis for project types that can be exempted from the system
- ◆ Implement programmatic compliance by issuing revised DAO 11

#### Air Quality Management

- ◆ Mobile emission control: promulgate regulations for emission standards, fuel specifications, and appropriate control technology
- ◆ Stationary sources: conduct technical investigations to consider dividing the country into Air Management Districts and develop carrying capacities for priority pollutants

#### Water Quality Management

- ◆ Intensify classification of major water bodies
- ◆ Develop regulation linking ambient and discharge standards through discharge permits in place of permits to operate
- ◆ Revise DAO 35 to integrate volumetric load of discharge to defeat dilution strategy
- ◆ Clarify sampling protocols among regional offices to eliminate disputes with industry on sample validity
- ◆ Develop with Fertilizer and Pesticides Authority (FPA) guidelines on use and handling of fertilizers and pesticides
- ◆ Execute and implement Memorandum of Agreement with the Philippine Coast Guard (PCG) on jurisdiction over marine pollution from sea-borne sources

#### Solid Waste Management

- ◆ Conduct an education and information campaign for LGUs on appropriate solid waste management options
- ◆ Prepare regulation on hospital waste management program in coordination with Department of Health (DOH)

### Jurisdictional Standing

- ◆ Conduct policy analysis on power sharing framework between DENR and LGUs on decentralization and devolution of environmental management functions

### Fines and Penalties

- ◆ Revise Pollution Adjudication Board (PAB) Resolution 10-A on scaling fines and penalties based on violation and ability to pay
- ◆ Define the procedure to assess fines
- ◆ Amend PAB procedure to issue Temporary Lifting Orders for fixed periods
- ◆ Improve DENR's management information system to track enforcement actions and fine collections

### Financial Responsibility

- ◆ Conduct policy dialogues on coverage, levels, and mechanisms for liability
- ◆ Conduct policy dialogues on establishing a pooled insurance fund

### 6.3.2 Sustainable Environmental Management

In December 1996, IEMP sponsored a DENR workshop attended by all DENR regions to discuss issues of PMA sustainability and how the program could be integrated into DENR plans and programs. Three major issues were discussed: (1) monitoring of PMAs as a Key Result Area (KRA); (2) recognition by DENR of the value of waste reduction in meeting compliance standards; and (3) devolving or deputizing DENR monitoring functions to LGUs. Recommendations of the group are included in the follow-on short-term action plan:

- ◆ Develop a DAO to define DENR policy regarding the PMA that would include critical industrial facilities, and require waste minimization and the PMA under PD 1586 and strictly implement under PD 984
- ◆ Revise DAO 17 to include all firms adopting the concept of waste minimization and the PMA process for all firms that undertake waste minimization programs

- ◆ Provide continuing orientation to the Regional Technical Directors (RTD) and Regional Executive Directors (RED) on the value of waste minimization as a compliance strategy and its relation with DENR's new vision and mission statement
- ◆ Strengthen basic monitoring requirements at the regional level (including adequate resources such as equipment, chemicals, and improved laboratory facilities)

In November 1995, IEMP assisted EMB in the preparation of a 5-year Industrial Environmental Management Action Plan (1996-2000) that incorporates IEMP's recommendations for policy reform and improved enforcement of environmental regulations. The elements of the Action Plan are briefly summarized as:

**POLICY FRAMEWORK - Command and control and market-based incentives to promote pollution reduction:** The Action Plan of PS 3,4,5 recommends a four-pronged approach: (1) increased monitoring of ambient conditions; (2) increased source emissions monitoring; (3) reforms in the permitting system; and (4) improved sanctions. The market approach to improved compliance centers on adoption of a pollution charge system that assesses a standard fee plus a loading charge for discharging effluents into the environment, and pollution management appraisals that identify opportunities to reduce pollution generation and thus lower pollution or loading charge.

The pilot implementation of the user fee system by LLDA provides DENR the opportunity to secure the legal authority to implement such a system on a national basis. It also provides an opportunity to study the LLDA implementation process and plan for a national system. The scale of the LLDA implementation offers valuable experience that DENR can apply to a phased-in program of pollution charges, perhaps focusing first on RGCs and private industrial estates such as PHIVIDEC.

**PRIORITIZATION OF INDUSTRIES TO FOCUS ON MONITORING AND ENFORCEMENT:** EMB proposes to adopt the NRIPS industrial prioritization system developed by IEMP and DENR in 1993 to more effectively focus limited resources on compliance monitoring and enforcement of discharge standards.

**ENVIRONMENTAL QUALITY MANAGEMENT:** EMB proposes implementation of the following action plans that draw extensively from IEMP outputs and policy support, and from the outputs of previous USAID-supported projects (Implementation of RA 6969, and Environmental Impact Statement Programmatic Compliance) implemented by PRC EMI for DENR.

**Air Quality Management Action Plan:** The air quality action plan recommends expanding ambient air monitoring beyond Metro Manila to 9 major urban centers, and, by 1998, establishing air quality monitoring districts to aid in the redefinition of the management approach for stationary air pollution sources. This approach of developing monitoring districts was also included in the draft Philippine Environmental Code.

**Water Quality Management Action Plan:**  
Components of this action plan include:

- ◆ **Classification of water bodies:**  
The action plan proposes to continue with the classification of receiving water bodies. EMB also proposes to change the permitting system by linking industrial effluents to ambient water quality standards.

**COMMENTS**

As a special activity, IEMP completed a water quality assessment of Sarangani Bay and the waters around Olango Island, both of which are learning areas of the Coastal Resource Management Project. The assessment results are important input to the classification of these water bodies.

- ◆ **Clarification of jurisdictional issues:** The project evaluation team recommended that DENR link policy reforms to other agencies and institutions. This action plan proposes to resolve conflicting jurisdictions and sanctions under the Mining Code, the Environment Code, and EIS law. Coordination is also suggested to extend on issues pertaining to pollution from sea-borne sources, and standards for marine disposal.

**COMMENTS**

The Coastal Resource Management Project can play a leading role in coordinating these efforts.

- ◆ **Institutionalization of the PMA process:** PMA as an effective market instrument to reduce pollution generation has been demonstrated by IEMP, the Metropolitan Environmental Improvement Project (MEIP), and the ASEAN-Environmental Improvement Project (ASEAN-EIP). Initiatives proposed by EMB will formalize the PMA technical guidelines through a department administrative order, and accreditation of PMA practitioners and private laboratories. Section 6.3.3 outlines an action plan to institutionalize the PMA in the regions as a Key Result Area.

**Hazardous Waste Management Action Plan:** EMB proposes full implementation of the DAO 29 which includes the management of toxic chemicals and hazardous waste. This will require EMB to manage and maintain the Philippine Inventory of Chemicals and Chemical Substances (PICCS), monitor compliance under the Priority Chemicals List (PCL), continuously screen new chemical substances under the Pre-manufacturing and Pre-Importation Notification (PMPIN) system, and the regulation of chemicals and chemical substances through the Chemical Control Order (CCO) system. EMB will also continue to build up DENRs capability to implement Title III (Hazardous Waste Management).

**Environmental Impact Assessment System Action Plan:** Extensive EIS system policy reforms are being implemented by DENR. EMB and IEMP have provided support to the House Committee on Ecology in revising the environmental code (House Bill No. 4) which, when passed, will provide the

legal authority for these reforms. In lieu of the revised environmental code, the following IEMP and EISPC outputs have or will strengthen existing regulations.

- ◆ **EIA Handbook:** IEMP has revised the EIA Handbook which recommends procedures and methodologies to be used in conducting environmental impact assessments
- ◆ **Programmatic Compliance Guidelines:** Guidelines proposed by EISPC have been successfully tested by the ecoprofile activity conducted by IEMP for the PHIVIDEC industrial estate near Cagayan de Oro. Interest in programmatic compliance is growing, but there is no basis for implementation as yet. We recommend full implementation of programmatic compliance through the issuance of the revised DAO 11.
- ◆ **Social Acceptability Guidelines:** IEMP assisted DENR in conducting nationwide dialogues on social acceptability. The recommended guidelines were considered in the revised EIS regulations and the EIS procedural guidelines.

**DEVOLUTION AND DECENTRALIZATION:** IEMP's PS 9 is DENR's principal source for addressing decentralization and devolution issues. DENR recognizes the need to intensify devolution and decentralization of compliance monitoring to LGUs and NGOs and recommends an institutional framework that defines the roles of EMB, EMPAS, PENRO, CENRO, and LGUs in environmental management.

A first step toward decentralization of enforcement would be to implement self-monitoring programs; to decentralize compliance monitoring to LGUs; and to deputize qualified NGO's to conduct compliance monitoring. The multipartite monitoring team originally created for monitoring ECC conditionalities may also be expanded to cover other aspects of compliance monitoring.

**IMPROVE THE MANAGEMENT INFORMATION SYSTEM:** IEMP and EMB have recommended integrating and standardizing existing management information systems. Several systems for tracking compliance monitoring exist including the EMB MIS system. Substantial compliance information is available but is not being routinely reported, encoded, utilized, and evaluated. An integrated system is critical to improve enforcement. EMB proposes to standardize and adopt the compliance monitoring protocols developed by IEMP since all regional staff have been trained in this system, and integrate the existing databases of several projects into the existing EMB MIS.

### 6.3.3 Sustaining IEMP Training Programs

The DENR/HRD training capacity was limited to basic EIA training, but they were interested in offering DCSSA and CM training based on IEMP programs. It was assumed by the project evaluation team that the HRD would take ownership of the environmental management training programs and that private sector training programs, particularly PMA and CA, would be offered by public institutions and professional and industrial associations.

The basic HRD phaseover plan has not been successful. HRD may not have the human and financial resources to sustain these training programs and DENR has yet to provide a clear implementation strategy. DENR should assess the capacity of HRD to effectively offer environmental training to its regional offices, LGUs, and NGOs. There are few alternatives to HRD in providing training unless sponsored by another foreign assisted project. With adequate resources, HRD could not only service demand within DENR, but could offer its services to other government agencies mandated to assist in implementing environmental regulations. The expertise needed to conduct training can be found among the consultants who worked with IEMP or the training could be conducted by DENR and EMB employees who have also worked with IEMP. The major constraint in using DENR and EMB employees will be finding time in an already overloaded schedule.

Phaseover strategy for public institutions and the private sector has not been adequately developed. There is, however, intense interest in IEMP training programs by public and private institutions. Such institutions as the Asian Institute of Management (AIM), University of Asia and the Pacific (UAP), and the Development Academy of the Philippines (DAP) have plans to offer training to private sector companies in waste minimization and the PMA process. This is also true with industry organizations such as the Pollution Control Association of the Philippines, Inc. (PCAPI), Philippine Sugar Millers Association (PSMA), and the Davao City Chamber of Commerce and Industry, Inc. (DCCCCI).

A strategy implemented by IEMP but was not evaluated due to time limitation was the direct support provided to the Davao City Chamber of Commerce and Industry, Inc. (DCCCCI) to develop environmental management and training services for its members. Any follow-on project to IEMP could evaluate the results of the support and, depending on findings, provide similar program support to other active chambers of commerce.

DCCCCI established an Industrial Environmental Management Council to:

- ◆ Set up programs and establish guidelines for the implementation of environmental programs
- ◆ Assist the DENR in strengthening public advocacy and dissemination on policy, institutional and administrative reforms

- ◆ Apply IEMP's capability building programs to the private sector
- ◆ Strengthen linkages of city government agencies with industry in environmental program implementation by encouraging industry-city government partnerships in promoting waste minimization and the PMA process
- ◆ Strengthen linkages with IEMP and with the natural and coastal resources management groups of DENR and the private sector
- ◆ Assist volunteer firms in identifying sources and procedures in securing environmental loans
- ◆ Improve environment information database
- ◆ Provide incentives for firms complying with environmental regulations

DCCCCI stated its objectives and devised strategies for the implementation of the Council's program. If successful it could be used as a model for other chambers and private institutions.

#### **6.3.4 Institutionalize the PMA as a Key Result Area**

DENR requested IEMP assistance in the second project extension for institutionalizing PMA as a key result area (KRA). The four-component action plan initiated by IEMP and DENR/EMB during the second project extension can continue to build using the tools developed by IEMP:

##### **Implementation Strategy**

- ◆ Orient DENR regional officials on waste minimization implementation strategy
- ◆ Formulate a DAO directing that all critical projects must undergo annual PMAs a conditionality of issuing an ECC
- ◆ Adopt IEMP's present PMA monitoring strategy
- ◆ Extend the moratorium on CDO's to all industries that are implementing waste minimization programs

##### **Training**

- ◆ Utilize and maintain the PMA database

- ◆ Adopt IEMP survey and assessment methodology
- ◆ Incorporate the technical and record keeping systems adopted by LLDA for its user fee system implementation

### **Promoting the PMA**

Effective PMA promotion was shown as critical to encourage firms to adopt waste minimization and the PMA process. DENR regional offices can adopt many of the features of IEMP's PMA marketing strategy outlined in Section 5. IEMP's publications (Pollution Management Guidebooks, Handbook on Financing Environmental Investments, and the Quick Reference Guide to evaluating waste minimization projects), and the public relations strategy of the Success Stories and annual DENR environmental achievement awards are excellent marketing tools to sell the benefits to be gained from waste minimization.

### **Support for Other Programs**

An effective strategy for institutionalizing the PMA process is to actively support public agencies and private institutions that promote waste minimization. Three active programs should be effectively supported by DENR.

- ◆ Support the Davao City Chamber of Commerce and Industry, Inc. and their Industrial Environmental Management Council. Consider extending similar programs to other chambers in any follow-on project.
- ◆ Support the Land Bank of the Philippines (LBP) and the Development Bank of the Philippines (DBP) to promote PMA in their respective environmental lending programs. The DENR/LBP EIA Networking System can be expanded to promote PMA as a compliance tool. DBP has already developed environmental management plans for several industry subsectors based on the adoption of the PMA process. DENR could offer moratorium to these firms and monitor implementation using the methodology developed by IEMP.
- ◆ Continue giving annual awards to industries in recognition of their efforts to effectively implement waste minimization programs.

**Appendix A**  
**IEMP PROJECT DESIGN SUMMARY**  
**LOGICAL FRAMEWORK**

PROJECT TITLE AND NUMBER: INDUSTRIAL ENVIRONMENTAL MANAGEMENT (492-0465)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><b>(A-1) Program or Sector Goal:</b> The broader objective to which this project contributes:</p> <p>To encourage sustained economic growth in the industrial sector, with corresponding improvements in health status.</p>	<p><b>(A-2) Measures of Goal Achievement:</b></p> <ul style="list-style-type: none"> <li>- Est. 2 to 5 percent increase in regional output per capita in geographic areas where pollution management appraisals (PMAs) are performed.</li> <li>- Est. 2 to 5 percent decrease in industrial pollution-related absenteeism among employees in geographic areas where PMAs are performed.</li> </ul>	<p><b>(A-3)</b></p> <ul style="list-style-type: none"> <li>- DTI statistics, reports</li> <li>- Board of investments data</li> <li>- DOH statistics, reports</li> <li>- PMA follow-up surveys</li> </ul>	<p><b>(A-4) Assumptions for achieving goal targets:</b></p> <ul style="list-style-type: none"> <li>- GOP policies encouraging an active private sector role in economic growth will continue</li> <li>- GOP policies endorsing voluntary industry actions to reduce pollution will continue</li> <li>- Political environment, law and order conditions remain stable</li> <li>- Improved pollution management will lead to economic growth</li> <li>- Reduction in industrial pollution will lead to improved health status</li> </ul>

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><b>(B-1) Project Purpose:</b></p> <p>To improve industrial management of pollution through: (a) preventing or reducing pollution at its sources; (b) reclaiming industrial wastes; and (c) encouraging cost-effective pollution abatement technologies.</p>	<p><b>(B-2) Conditions that will indicate purpose has been achieved: End-of-Project Status</b></p> <ul style="list-style-type: none"> <li>- Adoption of pollution prevention and reduction equipment/methods by approx. 50% of the firms that received PMAs</li> <li>- Approx. 5 to 10 percent decrease in industrial pollution at firms participating in PMAs.</li> </ul>	<p><b>(B-3)</b></p> <ul style="list-style-type: none"> <li>- PMA follow-up surveys</li> <li>- DENR, Independent pollution monitoring</li> <li>- DTI, Chamber of Commerce reports</li> <li>- DENR, LGU performance reports and independent verification</li> </ul>	<p><b>(B-4) Assumptions for achieving purpose:</b></p> <ul style="list-style-type: none"> <li>- GOP will act on recommended industrial environmental policy and regulatory changes</li> <li>- Training will lead to improved public and private sector performance in environmental monitoring and planning</li> <li>- Private sector will seize new business opportunities in industrial environmental management</li> <li>- Funding is available for industries to replace/upgrade equipment and install new processes.</li> </ul>

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS												
<p><b>(C-1) Project Outputs:</b></p> <ol style="list-style-type: none"> <li>1. Environmental risk assessment (ERA) to identify high-risk industrial sectors</li> <li>2. Facility-specific pollution management appraisals (PMAs)</li> <li>3. Policy studies on constraints to improved industrial pollution management and on voluntary industry action</li> <li>4. Improved public/private dialogue on environmental management issues</li> <li>5. Training in PMAs, ERAs, env. impact assessments, compliance</li> </ol>	<p><b>(C-2) Magnitude of outputs:</b></p> <ol style="list-style-type: none"> <li>1. ERA completed, and 5 high-risk industry sectors identified</li> <li>2. Completion of up to 150 PMAs</li> <li>3. Approx. ten policy studies completed</li> <li>4. Five public/private fora held on ind. env. mgmt. issues</li> <li>5. Approx. numbers of participants: PMA (200); ERA (60); EIA (700); compl. audit (200); compl. mon. (200); data collection/analysis (300).</li> </ol>	<p><b>(C-3)</b></p> <ul style="list-style-type: none"> <li>- Project records and quarterly/annual reports</li> <li>- Completed ERA, PMAs and policy studies</li> <li>- Contractor records and reports</li> <li>- GOP reports</li> <li>- Forum proceedings and recommendations</li> <li>- Post-training evaluation forms</li> </ul>	<p><b>(C-4) Assumptions for achieving outputs:</b></p> <ul style="list-style-type: none"> <li>- Industrial firms are willing to participate in PMAs</li> <li>- Appropriate training opportunities can be identified</li> <li>- Private sector firms willing to participate in cost-sharing</li> <li>- Interest, demand for voluntary pollution control measures can be tapped</li> </ul>												
<p><b>(D-1) AID Project Inputs:</b></p> <ol style="list-style-type: none"> <li>1. Pollution reduction initiatives</li> <li>2. Policy studies and public/private dialogue activities</li> <li>3. Capability building</li> <li>4. Evaluation and audit</li> </ol> <p><b>AID TOTAL</b></p>	<p><b>(D-2) Implementation Target (Type and Quantity):</b></p> <table border="0"> <tr> <td></td> <td style="text-align: right;"><u>(\$ 000)</u></td> </tr> <tr> <td></td> <td style="text-align: right;">13,000</td> </tr> <tr> <td></td> <td style="text-align: right;">2,800</td> </tr> <tr> <td></td> <td style="text-align: right;">3,700</td> </tr> <tr> <td></td> <td style="text-align: right;"><u>500</u></td> </tr> <tr> <td></td> <td style="text-align: right;"><u>20,000</u></td> </tr> </table>		<u>(\$ 000)</u>		13,000		2,800		3,700		<u>500</u>		<u>20,000</u>	<p><b>(D-3)</b></p> <ul style="list-style-type: none"> <li>- USAID financial records</li> <li>- Reports from contractors</li> <li>- Independent audits</li> </ul>	<p><b>(D-4) Assumptions for providing inputs:</b></p> <ul style="list-style-type: none"> <li>- Availability of AID funds over the life of the project</li> </ul>
	<u>(\$ 000)</u>														
	13,000														
	2,800														
	3,700														
	<u>500</u>														
	<u>20,000</u>														

Source: Industrial Environmental Management Project (492-0465) Project Paper, USAID/Philippines, September 1991.

## Appendix B IEMP Commodities List

Item Description	Qty	Unit
<b>OFFICE EQUIPMENT</b>		
Adaptor and battery for Cellular Phone	1	pc
Automatic Voltage Regulator (Power Grid 1500W)	2	pc
Calculating Machine (Canon P3211-D)	2	pc
Camera, Still Picture (Minolta x-300)	1	pc
CD-ROM Drive	2	pcs
Cellular Phone (various models; including batteries and chargers)	4	pcs
Computer Set, Desktop (various models)	5	sets
Computer Set, Notebook (Compaq Contura 486SX125)	5	sets
Copier Deposit (Fuji)	1	pc
Facsimile Machine (2 brands)	2	pcs
Fax/Cell Phone Interphase (Motorola)	1	pc
Filing Cabinet	2	pcs
Paper tray		
Printer (various models)	5	pcs
Single Inline memory module (for printer)	1	pc
Softwares (CorelDrawV3.0 &4.0, Lotus V3.4, Pagemaker V5.0, Quattro Pro V4.0, Wordperfect V6.0)	11	sets
Computer Table	1	pc
Typewriter, Electric	1	pc
<b>LABORATORY EQUIPMENT AND SUPPLIES</b>		
Conductivity Meter	1	pc
Current Meter Output	1	pc
Dissolved Oxygen Meter	1	pc
Hi-volume Sampler	1	pc
Various Laboratory Equipment and Supplies		
Steam Flow Meter	1	pc

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## Appendix C

### Summary of Mid-term Project Evaluation Results And Actions Taken by IEMP

USAID/Manila commissioned a mid-term project evaluation over a 6-week period between August 15 and September 24, 1994, conducted by the Pragma Corporation<sup>1</sup>. The purpose of the evaluation was to assist USAID in (a) assessing IEMP's overall goals and objectives, (b) evaluating project performance, and (c) generating recommendations for the future direction of the project during its remaining 2 years of implementation. In general, the evaluation team found that IEMP's contractors and grantees were satisfactorily carrying out the main activities of the project's three components.

IEMP considered the results of mid-term project evaluation to improve project implementation. Although there was no major redirection of project implementation, the recommendations made by the evaluation team were valuable for improving implementation of a number of project activities that enhanced project outputs and promoted the sustainability of project benefits.

#### 1.0 MAJOR FINDINGS AND RECOMMENDATIONS

Major findings and conclusions of the evaluation team abstracted from the USAID Evaluation Summary include the following:

- In general, IEMP should attain most of its objectives and deliver all outputs by September 1996.
- ▶ The initial assumption that industries will work voluntarily and cooperatively with IEMP has been proven effective and true.
- ▶ The pollution reduction initiatives methodologies need to be institutionalized.
- ▶ The policy studies conducted have generated strong private sector support to advocate policy reform in the environmental sector.
- ▶ The capability building efforts need to be institutionalized by the Government counterparts and should involve more private sector industry participation.
- ▶ Post project activities should continue to focus on industrial environmental issues but broadened to bring in coastal resources dimensions.

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<sup>1</sup>FINAL REPORT - INDUSTRIAL ENVIRONMENTAL MANAGEMENT PROJECT MID-TERM EVALUATION, USAID/Philippines, Project No. 492-0465, September 24, 1994; The Pragma Corporation, Independence Square, 116 East Broad Street, Falls Church, Virginia, 220406, USA

## 2.0 COMPONENT-SPECIFIC FINDINGS AND RECOMMENDATIONS

Brief summaries of findings and recommendations for the 3 project components are discussed in the following sections.

### 2.1 Pollution Reduction Initiative Component

Table C-1 is a brief summary of findings and recommendations of the evaluation team for the PRI component. Actions taken by IEMP included strengthening PRI methodologies to identify and quantify the most appropriate waste minimization activities. Also, additional PMA workshops were conducted for public sector participants to strengthen the understanding of waste minimization and the PMA process among LGUs and NGOs.

FINDINGS	RECOMMENDATION	ACTION
Baseline data is lacking for PMA firms making it difficult to measure <i>project impact</i> .	Design methodology to collect baseline data.	IEMP developed a 4-volume instruction set called <i>Pollution Management Appraisal Guidelines (PMAG)</i> .
PMA firms implement no-cost and low-cost options, but not capital intensive options. Large companies appear to be developing and implementing their own pollution control solutions, and there is evidence that PMAs play an important role in convincing firms to invest in pollution management.	Quantitatively measure PMA benefits.	The PMAG volumes 2 and 3 developed methodology to measure results.
Some firms need additional technical support for technical and <i>financial feasibility studies</i> and help with loan applications.	Modify existing procedures of conducting survey and assessments (SA) to verify progress reports by PMA firms.	<ol style="list-style-type: none"> <li>1. IEMP provided detailed technical and financial analyses in PMA reports and offered assistance with loan applications; however, no volunteer firm requested assistance with loan applications.</li> <li>2. Volume 3 of the PMAG addresses improved SA procedures.</li> </ol>

FINDINGS	RECOMMENDATION	ACTION
<p>Participation of DENR in promoting and conducting PMAs needs to be increased for early institutionalization of the PMA process. Also, LGUs and NGOs must be brought into the process.</p>		<p>DENR participated in on-site PMAs to the degree allowed by volunteer firms and provided resource persons for PMA workshops. Also, special PMA workshops were conducted for DENR, NGOs, and LGUs. Most DENR regional offices joined IEMP during survey and assessments during the later part of IEMP.</p> <p><i>Comment: Institutionalization of the PMA process at the regional level has not been completed. Promoting PMAs is a key result area (KRA) but implementing guidelines have yet to be finalized by DENR.</i></p>
	<p>Design and implement a comprehensive environmental and natural resources program based on improved IEMP methodologies in coastal zones with high potential for industrial growth.</p>	<p>During the first project extension IEMP conducted (1) an ecoprofile for the PHIVIDEC industrial estate, (2) baseline water quality studies for Sarangani Bay and Olango Island near Cebu; and (3) pollution source survey in CRMP learning area municipalities in Bais Bay.</p>

TABLE C-1. EVALUATION TEAM FINDINGS FOR PRI AND ACTIONS TAKEN BY IEMP

## 2.2 POLICY STUDIES COMPONENT

The evaluation team found the IEMP Policy Studies component contributed directly to addressing critical issues of environmental management, strengthening the EIS system, promoting market-based instruments, and devolving responsibility to LGUs and NGOs for compliance monitoring. Table C-2 is a brief summary of the findings and recommendations. Actions taken by IEMP on the recommendations included providing more policy support to DENR and strengthening IEMP linkages to coastal resource management.

FINDING	RECOMMENDATION	ACTION
<p>IEMP's policy studies component has significantly influenced the direction and strategy of the Philippine industrial environmental framework. IEMP has the flexibility to respond quickly to DENR requests for assistance.</p>	<ol style="list-style-type: none"> <li>1. DENR must strengthen public advocacy and dissemination of the policy, institutional, and administrative reforms outlined in PS 8, and strengthen linkages with other government institutions and industry.</li>   <li>2. Strengthen linkages with ENRAP III<sup>2</sup> and the policy studies component of IEMP to provide a macro economic perspective to IEMP.</li>   <li>3. Initiate ecoprofiling and examine inter-linkages between the coastal zones and industrial development in selected critical areas.</li> </ol>	<ol style="list-style-type: none"> <li>1. IEMP funded a temporary Information, Education, and Communications (IEC) position at the office of the DENR Undersecretary for Environment and Programs Development to assist in preparing a public awareness strategy for policy implementation.</li>   <li>2. ENRAP/IEMP linkage was through the Sectoral Studies on Pollution conducted by ENRAP. IEMP data on several sectors were used by ENRAP to estimate the value of environmental waste disposal services of air and water resources</li>   <li>3. Ecoprofiling guidelines were developed by the USAID-funded Environmental Impact Statement Programmatic Compliance (EISPC) project in 1995. IEMP tested the guidelines as a special activity during the 5-month extension of IEMP by conducting an ecoprofile of the PHIVIDEC industrial estate.</li> </ol>

**TABLE C-2. EVALUATION TEAM FINDINGS FOR POLICY STUDIES AND ACTIONS TAKEN BY IEMP**

### 3.2.3 Capability Building Component

The evaluation team found the implementation of the Capability Building component of the project to be consistent with the project design. Table C-3 summarizes the findings and recommendations of

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<sup>2</sup>Environmental and Natural Resources Accounting Project (Phase III) funded by USAID

the evaluation team. The primary action taken by IEMP on the recommendations was to conduct a training needs assessment of public sector employees in DENR regional offices, NGOs, and LGUs.

FINDING	RECOMMENDATION	ACTION
<p>The PP and other documents do not provide a clear training strategy or rationale, and it is difficult to determine if the right persons are being trained.</p>	<ol style="list-style-type: none"> <li>1. Conduct a needs assessment for public sector employees and develop a detailed training strategy and selection criteria.</li> <li>2. Initiate action to accelerate planned training for the private sector, particularly for the Compliance Audit (CA) workshop.</li> <li>3. Delay the scheduling of any additional micro ERA training programs until USAID has reviewed and approved the framework for the application and utilization of micro ERAs. PRC EMI should review the feasibility of combining EIA and micro ERA training.</li> </ol>	<ol style="list-style-type: none"> <li>1. IEMP conducted a training needs assessment of public sector employees from the last quarter of 1994 to the first quarter of 1995.</li> <li>2. IEMP increased the number of planned CA workshops to meet demand.</li> <li>3. No further ERA training was conducted; resources saved were allocated to other training programs, especially EIA training for LGUs and NGOs.</li> </ol>
<p>IEMP has not developed an approach that can elicit the degree of NGO training required. Strong NGO participation is desired.</p>		<p>See related discussion in Section 4 of the EOP</p>

**TABLE C-3. EVALUATION TEAM FINDINGS FOR CAPABILITY BUILDING AND ACTIONS TAKEN BY IEMP**

## 2.4 PROJECT SUSTAINABILITY

The evaluation team observed that project design contained no strategy for sustainability. USAID's intent, however, is that the main IEMP sustainability strategy was to promote concepts that provide immediate and direct benefits to beneficiaries. Voluntary participation by industry and the investment in and benefits derived from waste minimization was perceived to indicate that participating industries are sustaining the activities on their own. The evaluation team also observed that sustainable reforms would require institutional changes, to which USAID added attitudinal changes as another necessity.

The evaluation team's findings and recommendation are summarized in Table C-4.

FINDING	RECOMMENDATION	ACTION
<p>There is a continuing need for capacity building within the DENR to train its own staff on environmental compliance and monitoring standards/regulations. A similar need exists to ensure the continuation of PMAs and other needed training for private industry.</p>	<p>1. Responsibility for post-project IEMP training for government personnel should be transferred to DENR Human Resources Division (HRD). IEMP should develop a training phaseover strategy to ensure that the appropriate faculty receives needed training prior to the end of the project .</p>	<p>1. IEMP worked closely with the DENR/HRD to develop a phaseover strategy to ensure the sustainability of IEMP training resources. This strategy included (1) seconding DENR/HRD staff to work directly with the IEMP Capability Building component; (2) DENR observing and actively participating in IEMP workshop organizations and conduct; (3) adding special Train-the-Trainer workshops aimed specifically at DENR, LGUs, and NGOs; and (4) conducting a public sector needs assessment through DENR regional offices.</p> <p><i>Comment: The phaseover strategy developed by IEMP and the DENR/HR was implemented but the effectiveness of DENR/HRD in utilizing IEMP training resources has not yet been demonstrated.</i></p>
	<p>2. Responsibility for post-project IEMP training for private industry should be transferred to the private sector or NGO; examples are Philippine Business for the Environment (PBE) ) or Pollution Control Association of the Philippines, Inc. (PCAPI). IEMP needs to develop a training strategy similar to that for DENR.</p>	<p>2. See Section 5 of EOP</p>

**TABLE C-4. EVALUATION TEAM FINDINGS ON SUSTAINABILITY AND ACTION TAKEN BY IEMP**

## Appendix D

### List of Pma Volunteer Firms

#### PRODUCTION OF COCONUT OIL

Interco Manufacturing Corporation  
 Philippine International Development  
 Company  
 Metro Cagayan Oil Mills  
 Granexport Oil Milling  
 Cagayan de Oro Oil Company, Inc.  
 Legazpi Oil Company, Inc. - Legazpi  
 Naga Sunbeam Corporation  
 Co Say and Company, Inc.  
 Unicab Industries, Inc.  
 Legazpi Oil Company - Davao  
 Ludo and Luym

Permex Producer & Exporter Corporation  
 Inglenook Foods Corporation  
 Nautica Canning Corporation  
 Republic Flour Mills Tuna Cannery Corp.  
 Philippine Sea Food Enterprise, Inc.  
 Unifish Packing Corporation  
 Polysaccharide Corporation  
 Deltagen, Inc.  
 Sedgewick Traders Corporation  
 FMC Marine Colloids (Philippines), Inc.  
 Shemberg Marketing Corporation  
 Shemberg Biotech Corporation  
 Davao Agro Marine Resources, Inc.  
 Genu Philippines, Inc.

#### MANUFACTURE OF DESICCATED COCONUT

Blue Bar Coconut Philippines, Inc.  
 Peter Paul Philippines Corporation  
 Cocogold Manufacturing Industries, Inc.  
 Lucena Desiccated Coconut Products, Inc.  
 Franklin Baker Company of the Philippines  
 Fiesta Brands, Inc.  
 Primex Coco Products  
 Atson Coco, Inc.  
 Tropicana Food Products, Inc.  
 Pacific Royal Basic Foods, Inc.  
 Superstar Coconut Products, Inc. -  
 Quezon

#### FRUIT AND VEGETABLE CANNING AND PRESERVING

Del Monte Philippines, Inc.  
 Crown Packing International, Inc.  
 Philexon International, Inc.  
 APO Commodities Corporation  
 Marsman Estate Plant, Inc.  
 Pacific Fruits Processors, Inc.  
 Suni Farms (UFC)  
 Sirawan Food Corporation

#### CANNING AND PROCESSING OF FISH AND OTHER SEAFOOD

Seatrade Development Corporation  
 Celebes Canning Corporation  
 Sta. Monica Tuna Canning Corporation  
 Purefoods Tuna Canning Corporation  
 Mar Fishing Company, Inc.

#### HOG RAISING

Cordoba Farms  
 Puyat National Pig Development Center  
 Supreme Farm Products Trading  
 GNG Farms Corporation  
 Susana Farms  
 Embassy Farms, Inc. (Meanwell)  
 Baconhill Agri-Resources, Inc.  
 Jhon & Jhon Farms  
 Petunia Farms, Inc.

Mira Farms, Inc.  
Multi-Farms Agro Industrial Corporation  
Asturias Farms  
International Farms Corporation  
Springside Farm  
Leslie Farms

#### **CHICKEN RAISING**

FRK Farms  
Lansang Farms  
Zepeda Agro-Industrial Company  
Lasat Integrated Farms Corporation

#### **MANUFACTURE OF OTHER GRAIN MILL PRODUCTS**

Phil-Agro Industrial Corporation  
Philstarch Industrial Corporation  
Universal Starch Corporation  
Pacific Starch, Inc.  
General Milling Corporation

#### **SUGAR MILLING AND REFINING**

Central Azucarera Don Pedro  
Caneland Sugar Corporation  
Pampanga Sugar Development Co., Inc.  
First Farmer's Holding Corporation  
Capiz Sugar Central, Inc.  
New Frontier Sugar Corporation  
Noah's Ark Sugar Holdings  
Central Azucarera de Bais, Inc.  
Passi Sugar Central, Inc.  
Herminio Teves Company, Inc.  
Ma-ao Sugar Central Company, Inc.  
National Sugar Refineries Corporation  
Central Azucarera de Tarlac  
Bogo-Medellin Milling Company, Inc.  
Hawaiian Philippines Company

#### **SLAUGHTERING AND PRESERVING MEAT**

Cebu City Modern Abattoir  
Sunpride Foods, Inc.  
Vitarich Corporation  
Cagayan de Oro Meat Industry  
First Farmers Food Corporation  
Nenita Quality Foods

#### **MANUFACTURE OF FABRICATED METAL PRODUCTS**

Norkis Electroplating Group  
Dyzon Powder Coating Corporation  
Rigid Metals Manufacturing Corporation  
Polytech Industrial Corporation  
First Asian Metals Corporation  
Norkis Trading Corporation  
Sonic Steel Industries, Inc.  
Ebara Benguet, Inc.

#### **MANUFACTURE OF INDUSTRIAL CHEMICALS**

Pilipinas Kao, Inc.  
Resins, Inc.  
Glu-Mar Commercial  
Polestar International Trading  
Colgate-Palmolive Philippines, Inc.  
United Coconut Chemicals, Inc.

#### **MANUFACTURE OF PULP, PAPER, AND PAPER PRODUCTS**

United Pulp and Paper Company, Inc.  
Bataan Pulp and Paper, Inc.  
Metro Paper & Packaging Products, Inc.  
Trust International Paper Corporation  
Isarog Pulp and Paper Company, Inc.  
GSG Handmade Paper Industries  
Steniel Manufacturing Corporation  
Canlubang Pulp Mfg. Corporation

**MANUFACTURE OF CEMENT**

Rizal Cement Company, Inc.  
Solid Cement  
Pacific Cement Company, Inc.  
Apo Cement Company, Inc.

**DISTILLING AND BLENDING SPIRITS**

Central Fermentation Industrial Corp.  
Far East Alcohol Corporation  
Dyzum Distillery, Inc.  
La Tondena Distillers, Inc.

**TANNERIES AND LEATHER FINISHING**

Uni-Leather Country Corporation  
Valenzuela Tannery Corporation

**MANUFACTURE OF WOOD AND WOOD PRODUCTS**

Cotabato Timberland Company, Inc.  
Philippine Wallboard Corporation  
AG&P, Inc.

**SOFTDRINKS AND CARBONATED WATER MANUFACTURING**

Coca-Cola Bottlers, Inc. - Zamboanga  
Pepsi Cola Products Philippines -  
Zamboanga

**SHIPBUILDING AND REPAIRING**

Varadero de Recodo

**MANUFACTURE OF NON-METALLIC MINERAL PRODUCTS, (NOT ELSEWHERE CLASSIFIED)**

Refractories Corporation of the Philippines

**GOLD AND OTHER PRECIOUS METAL REFINING**

Minex Mining Development Corporation

**MANUFACTURE OF RUBBER AND RUBBER PRODUCTS**

Native West International  
Fibertex Corporation  
Hi-Lon Manufacturing Corporation, Inc.

**LAUNDRIES AND LAUNDRY SERVICES**

FL Steam Laundry

**BISCUIT MANUFACTURING**

F. Martinez and Company, Inc. (La Pacita)

**NON FERROUS SMELTING AND REFINING PLANT**

Philippine Recyclers, Inc.

## Appendix E

### List of Host Country Pma Consultants

CONSULTANT	FACILITY
1. Alice Belen, PRC EMI	Solid Cement Corporation Far East Alcohol Corp. Solid Cement Corp. South Pacific Sugar Corp. Universal Starch Corp. Dyzum Distillery
2. Andrew, Montalbo, EPAI	Dyzum Distillery, Sirawan Food Corp.
3. Angela Escoto, UPERDFI	United Coconut Chemicals, Inc.
4. Beth Ignacio, EPAI	Dyzon Powder Coating Corp. FRK Farms Phil. Int'l. Dev. Corp. (PHIDCO) Supreme Farms Products Trading Sedgewick Traders Corporation
5. Ruel Janolino, SKI	Co Say and Co., Inc. International Farms Corporation Sunpride Foods, Inc. Bogo-Medellin Milling Co. Puyat National Pig Dev. Center Unifish Packing Corporation Permex Producer & Exporter Corp. Nautica Canning Corp. Ma-ao Sugar Central Co., Inc. Herminio Teves Company, Inc.
6. Daisy Serrano, EPAI	Lansang Farms First Farmers Dressing Plant International Pharmaceutical, Inc. Vitarich Corporation Phi. Agro-Ind'l. Corp. Interco Mfg. Corp. Universal Starch Corporation Springside Farms Leslie Farms
7. Darryl Babor, EPAI	Phil. Recyclers, Inc.
8. Edgardo Alpay, SKI	Lucena Desiccated Coconut Blue Bar Coconut Philippines Rizal Cement Central Fermentation Ind'l. Corp. Cordoba Farms

CONSULTANT	FACILITY
9. Edgar de Jesus, PRC EMI	Baconhill Agro-Resources GNG Farms Mira Farms Del Monte Phils., Inc. Minex Mining Corporation Franklin Baker Co. of the Philippines Philexson International, Inc. Susana Farms, Inc. Crown Packing Internationa, Inc. Norkis Trading Co., Inc. Multifarms Agro Industrial Corp. Cebu City Modern Abbatoir Uni-Leather Country Corp. Cotabato Timberland Co., Inc. Inglenooke Foods, Inc. Capiz Sugar Central New Frontier Sugar Corporation First Asian Metals Corp. Philippine Sea Food Enterprises, Inc. Ebarra Benguet, Inc. Atson Coco, Inc. Legazpi Oil Co., Inc. Genu Philippines, Inc. Hilow Manufacturing Corp. F. Martinez Co., Inc.
10. Ronillo Suazo, Independent Consultant	GNG Farms Meanwell farms (Embassy) Coco Gold Mfg. Industries Multi-Farms Agro Industrial Corp. Cagayan de Oro Oil Mills Granexport Oil Milling Nenita Quality Foods
11. Helen Cruda, SKI	Blue Bar Coconut Phils. Bataan Pulp and Paper Corp.
12. Francisco Arellano, UPERDFI	Cordoba Farms Cagayan de Oro Meat Industry Deltagen Inc.
13. Edna Pascual, EPAI	RFM Tuna Canning Apo Commodities Corp.
14. Efren Mariano, SKI	Norkis Trading Co., Inc.

CONSULTANT	FACILITY
15. Elvie Tumlos, EPAI	Susan Farms Uni-Leather Country Club Pepsi-Cola Products Philippines Capiz Sugar Central New Frontier Sugar Corp. Tropicana Food Products Mira Farms Pacific Starch
16. Elpidio Octura, SKI	Seatrade Dev. Corp. Sancanco Canning Corp.
17. Emmanuel Anglo, EPAI	Pacific Cement Co., Inc.
18. Erlindo Villamor, EPAI	Philexson Int'l. Inc. Purefoods Canning Corp.
19. Florencio Ballesteros, Jr. UPERDFI	Sonic Steel Genu Phils., Inc.
20. Gray Gopez, EPAI	Rigid Metals Mfg. Corp. Jhon & Jhon Farms
21. Leticia dela Cruz, EPAI	Rigid Metals Mfg. Corp.
22. Ida Febrero, SKI	Baconhill Agro-Resources Trust Int'l. Paper Corp. Peter Paul Corp.
23. Oscar Jusi, SKI	Baconhill Agro-Resources Celebes Canning Corp. Franklin Baker Co. of the Phils. Resins, Inc. Valenzuela Tannery Corp. Varadero de Recodo Central Azucarera de Bais Primex Coco Products Pacific Fruits
24. Julie Urquia, SKI	Petunia Farms Mar Fishing Co., Inc. GSG Handmade Paper Products Zepeda Agro Industrial Corp. Lasat Integrated Farms Corp.

CONSULTANT	FACILITY
25. Lloly de Jesus, PRC EMI	Dyzon Powder Coating Corp. Polytech Industrial Corp. Blue Bar Coconut Phils. Pilipinas Kao, Inc. Coco Gold Mfg. Industries Resins, Inc. Fiesta Brands, Inc. Philstarch Industrial Corp. Bataan Pulp & Paper Corp. Pampanga Sugar Dev. Corp. Polysaccharide Corp. Nautica Canning Corp. Central Azucarera de Tarlac Cntral Azucarera de Bais Metro Cagayan Oil Mill Native West Rubber Corp. Primex Coco Products Sonic Steel Industries, Inc. Sedgewick Traders Corporation Shemberg Biotech Corp. Pacific Fruits Superstar Coconut Products (Davao)
26. Lourdie Castillo, SKI	First Farmer's Holding Corp. Passi (Iloilo) Sugar Central, Inc.
27. Marcial Semira, Independent Consultant	Metro Cagayan Oil Mills Ebarra Benguet, Inc. Steniel MFG. Corp. Isarog Pulp & Paper Co., Inc. Suni Farms Superstar Coconut Products, Inc. JV La Suerte Piggery General Milling Corp. Ludo and LuYm
28. Marivic Guina, EPAI	Polytech Ind'l. Corp. Glu-Mar Commercial Coca-Cola Bottlers Phils. National Sugar Refineries Corp. First Asian Metals Corp. Atson Coco, Inc.
29. Marlito Cardenas, EPAI	Crown Packing Int'l. Corp. Phil. Wallboard Corp. Philstarch Ind'l. Corp. United Pulp and Paper Corp. Polysaccharide Corp.
30. Marlo Tubong Banua, UPERDFI	Native West Rubber Corp.

CONSULTANT	FACILITY
31. Nelson de Guzman, SKI	Sancanco Canning Corp. Peter Paul Corp. Fiesta Brands, Inc. Phil. Sea Food Ent., Inc. Minex Mining Corp. Inglenook Foods, Inc.
32. Bienvenido Sevilla, SKI	Sancanco Canning Corp.
33. Reynaldo Esguerra, PRC EMI	Pilipinas Kao, Inc. APO Cement Shemberg Marketing Corp. F. Martinez Co., Inc.
34. Ulysses Nazario, EPAI	Cotabato Timberland Co., Inc. La Tondeña Distillers, Inc.
35. Amira Goki, PRC EMI	Rigid Metals Mfg. Corp. FRK Farms Lansang Farms Jhon & Jhon Farms Philippine Agro-Industrial Corp. Philippine Wallboard Corp. Cagayan de Oro Meat Industry International Pharmaceutical, Inc. Celtagen, Inc. United Pulp and Paper Corp. Vitarich Corp. Interco Mfg. Corp. Pepsi Cola Products Phils. Caneland Sugar Corp. Noah's Ark Sugar Holdings Phil. International Dev. Co. Cagayan de Oro Oil Mill Pacific Starch Pacific Cement Co., Inc. AG&P, Inc. Tropicana Food Products GSG Handmade Paper Products Isarog Pulp & Paper Co., Inc. La Tondeña Distillers, Inc. Shemberg Marketing Corporation Hawaiian Phil. Co. First Farms Dressing Plant Legazpi Oil Co. (Davao) Apo Cement Corp.

CONSULTANT	FACILITY
36. Victor Luis, EPAI	Central Azucarera Don Pedro Cebu City Modern Abattoir Pampanga Sugar Dev. Corp. Jhon & Jhon Farms Asturias Farms Naga Sunbeam Corp. Legazpi Oil Co., Inc. First Marine Colloids, Inc. Fibertex Corp. Hilton Mfg. Corp. Canlubang Pulp Mfg. Corp. Legazpi Oil Co., Inc. (Davao) Superstar Coconut Products (Davao)
37. William Matuguina, Independent Consultant	Minex Mining Corp. Colgate-Palmolive Phils. Central Azucarera de Tarlac Refractories Corp. of the Phils. Metro Paper and Packaging Products AG&P, Inc. Norkis Electroplating Group Polestar Int'l. Trading Far East Alcohol Corp. Unicab Industries, Inc. Caneland Sugar Corp. Noah's Ark Sugar Holdings
38. Dionisio Araza, PRC EMI	Cordoba Farms Puyat National Pig Dev. Center Rizal Cement Supreme Farm Products Trading Lucena Desiccated Coconut Meanwell Farms Trust International Paper Corp. Valenzuela Tannery Corp. Varadero de Recodo Mar Fishing Co., Inc. First Farmers Holding Corp.
39. Imelda Valle, PRC EMI	Apo Commodities Corp. Glu Mar Commercial Ma-ao Sugar Central Co., Inc. Co Say & Co., Inc. Asturias Farms Suni Farms JV La Suert Piggery

CONSULTANT	FACILITY
40. Robyn Lebrilla, PRC EMI	Steniel Manufacturing Corp. Naga Sunbeam Corp. Zepeda Agro Industrial Corp. Central Azucarera de Don Pedro Peter Paul Corp. Celebes Canning Corp. Sancanco Canning Corp. Purefoods Canning Corp. Polestar International Trading Sunpride Food, Inc. Unifish Packing Corp. Petunia Farms Coca-Cola Bottlers Phils. Permex Products and Exporters Corp. Herminio Teves Company, inc. Granex Oil Milling Metro Paper and Packaging Products Bogo Medellin Milling Co.
41. Chona Cristobal, PRC EMI	Davao Agro Marine Resources, Inc. Fibertex Corp. F.L. Laundry Sirawan Food Corp. International Farms Corp.
42. Leonard Faller, PRC EMI	Refractories Corp. of the Philippines Colgate-Palmolive Phils. Lasat Integrated Farms Corp. FMC Marine Colloids, Inc. Canlubang Pulp Mfg. Corp. Superstar Coconut Products, Inc. Leslie Farms
43. Marivie Cepeda, PRC EMI	Central Fermentation Industrial Corp. Phil. Recyclers, Inc. Passi Sugar Central United Coconut Chemical, Inc. Pacific Royal Foods, Inc.
44. Annie Sto. Domingo, PRC EMI	General Milling Corp. Ludo and LuYm Nenita Quality Foods

Acronym:

- PRC EMI - PRC Environmental Management, Inc.
- EPAI - Environmental Primemovers of Asia, Inc.
- SKI - Schema Konsult, Inc.
- UPERDFI - University of the Philippines - Engineering Research and Development Foundation, Inc.

## Appendix F Regional NRIPS Ranking, 1993

**TABLE IA - TOP 10 RANKING INDUSTRIES: REGION 1**

Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1. Canning and Preserving of Fruits and Vegetables (3114)	2/2	63.3
2. Steel Works and Rolling Mills (3712)	1/3	61.0*
3. Production of Crude Coconut Oil, Including Cake and Meal (3116)	1/1	57.0*
4. Manufacture of Cement (3630)	2/2	53.0
5. Manufacture of Special Industrial Machinery and Equipment, Except Metal and Woodworking Machinery (3824)	1/1	49.0*
6. Storage and Warehousing, Not Elsewhere Classified (7209)	1/1	48.5*
7. Soft Drink and Carbonated Water Manufacturing (3134)	5/9	48.2
8. Manufacture of Pesticides, Insecticides, Fungicides, and Herbicides (3514)	1/3	46.5*
9. Motor Repair Shop for Vehicles, Including Overhauling (9711)	1/1	45.0*
10. Distilling, Rectifying, and Blending Spirits (3131)	2/2	44.5

\* Industry average based on the score of an individual facility.

**TABLE IB - TOP 15 RANKING FACILITIES: REGION 1**

Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1. <sup>b</sup> - Soft Drinks and Carbonated Water Manufacturing (3134)	66.5
2. <sup>b</sup> - Canning and Preserving of Fruits and Vegetables (3114)	65.5
3. <sup>b</sup> - Canning and Preserving of Fruits and Vegetables (3114)	61.0
4. <sup>b</sup> - Steel Works and Rolling Mills (3712)	60.0
5. <sup>b</sup> - Distilling, Rectifying, and Blending Spirits (3131)	60.0
6. <sup>b</sup> - Soft Drinks and Carbonated Water Manufacturing (3134)	59.0
7. <sup>b</sup> - Hog Raising (1213)	59.0
8. <sup>b</sup> - Soft Drinks and Carbonated Water Manufacturing (3134)	58.0
9. <sup>b</sup> - Manufacture of Cement (3630)	58.0
10. <sup>b</sup> - Production of Crude Coconut Oil, Including Cake and Meal (3116)	57.0
11. <sup>b</sup> - Soft Drinks and Carbonated Water Manufacturing (3134)	51.5
12. - Hog Raising (1213)	
13. - Manufacture of Bakery Products (3122)	49.0
14. - Manufacture of Special Industrial Machinery and Equipment, Except Metal and Woodworking Machinery (3824)	
15. - Storage and Warehousing, Not Elsewhere Classified (7209)	48.5

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility is also included in the regional DENR list of most pollutive facilities.

**TABLE 2A - TOP 10 RANKING INDUSTRIES: REGION 2**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Sugar Milling and Refining (3123)	1/1	56.0*
2.	Petroleum and Petroleum Products, Wholesaling (6180)	2/2	48.5
3.	Soft Drink and Carbonated Water Manufacturing (3134)	1/1	42.5*
4.	Hog Raising (1213)	2/6	38.5
5.	Slaughtering, Preparing, and Preserving Meat (3111)	2/6	36.5
6.	Manufacture of Non-Metallic Mineral Products Not Elsewhere Classified (3699)	1/2	30.5*
7.	Sawmills and Planing Mills (3311)	13/574	27.3
8.	Manufacture of Veneer and Plywood (3312)	2/2	24.3
9.	Rice and Corn Milling (3118)	46/337	21.7
10.	Manufacture and Repair of Wood Furniture, Including Upholstery (3321)	31/31	19.7

\* Industry average based on the score of an individual facility.

**TABLE 2B - TOP 15 RANKING FACILITIES: REGION 2**

	Facility Category* (NEDA Classification Code)	NRIPS Score
1.	- Petroleum and Petroleum Products, Wholesaling (6180)	51.5
2.	<sup>b</sup> - Sugar Milling and Refining (3123)	56.0
3.	- Sawmills and Planing Mills (3311)	48.0
4.	<sup>b</sup> - Petroleum and Petroleum Products, Wholesaling (6180)	45.5
5.	<sup>b</sup> - Soft Drink and Carbonated Water Manufacturing (3134)	42.5
6.	- Hog Raising (1213)	41.0
7.	- Slaughtering, Preparing, and Preserving Meat (3111)	40.5
8.	- Hog Raising (1213)	36.0
9.	- Slaughtering, Preparing, and Preserving Meat (3111)	32.5
10.	- Rice and Corn Milling (3118)	31.0
11.	- Manufacture of Non-Metallic Mineral Products, Not Elsewhere Classified (3699)	30.5
12.	- Sawmills and Planing Mills (3311)	30.0
13.	- Manufacture and Repair of Wood Furniture, Including Upholstery (3321)	29.0
14.	- Sawmills and Planing Mills (3311)	28.0
15.	- Rice and Corn Milling (3118)	

\* Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 3A - TOP 10 RANKING INDUSTRIES: REGION 3**

Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1. Manufacture of Paints, Varnishes, and Lacquers (3521)	1/1	60.5*
2. Manufacture of Pulp, Paper, and Paperboard (3411)	5/6	59.0
2. Petroleum Refineries (3530)	2/2	59.0
4. Sugar Milling and Refining (3123)	5/5	54.9
5. Soft Drink and Carbonated Water Manufacturing (3134)	3/3	54.7
6. Non-Ferrous Smelting and Refining Plant, Except Precious Metals (3722)	3/3	53.8
7. Manufacture of Vegetable and Animal Oils and Fats (3117)	1/1	53.5*
8. Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	1/1	53.0*
9. Distilling, Rectifying, and Blending Spirit (3131)	5/5	51.7
10. Malt Liquors and Malt (3133)	1/1	50.5*
10. Manufacture of Synthetic Resins, Plastic Material, and Man-Made Fiber, Except Glass (3513)	1/1	50.5*

\* Industry average based on the score of an individual facility

**TABLE 3B - TOP 15 RANKING FACILITIES: REGION 3**

Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1. - Non-Ferrous Smelting and Refining Plant, Except Precious Metals (3722)	69.5
2. <sup>b</sup> - Sugar Milling and Refining (3123)	67.0
3. <sup>b</sup> - Sugar Milling and Refining (3123)	66.5
4. <sup>b</sup> - Manufacture of Pulp, Paper, and Paperboard (3411)	
5. <sup>b</sup> - Distilling, Rectifying, and Blending Spirits (3131)	63.0
6. - Steel Works and Rolling Mills (3712)	60.5
7. - Tanneries and Leather Finishing (3231)	
8. - Manufacture of Paints, Varnish, and Lacquer (3521)	
9. - Petroleum Refineries (3530)	60.0
10. - Manufacture of Pulp, Paper, and Paperboard (3411)	
11. - Manufacture of Pulp, Paper, and Paperboard (3411)	59.5
12. <sup>b</sup> - Manufacture of Cement (3630)	
13. <sup>b</sup> - Iron and Steel Foundries (3713)	
14. - Spinning, Weaving, Texturizing, and Finishing Textiles (3211)	
15. <sup>b</sup> - Petroleum Refineries (3530)	58.0
16. <sup>b</sup> - Generating and Distributing Electricity (4110)	

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 4A - TOP 10 RANKING INDUSTRIES: REGION 4**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Copper Ore Mining (2130)	1/1	68.0*
2.	Nickel Ore Mining (2140)	1/1	67.0*
3.	Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	2/2	65.8
4.	Chromite Ore Mining (2150)	1/1	58.5*
5.	Sugar Milling and Refining (3123)	2/2	55.5
6.	Manufacture of Desiccated Coconut (3125)	5/5	55.0
7.	Petroleum Refineries (3530)	2/2	53.5
8.	Mineral, Metals, and Industrial Chemicals, Except Crude Petroleum, and Petroleum Products, Dealing (6170)	1/22	50.5
9.	Distilling, Rectifying, and Blending Spirits (3131)	4/4	48.3
10.	Gold and Other Precious Metal Refining (3721)	1/1	48.0*
11.	Generating and Distributing Electricity (4110)	12/20	48.0

\* Industrial average based on the score of an individual facility.

**TABLE 4B - TOP 15 RANKING FACILITIES: REGION 4**

	Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1.	<sup>b</sup> - Generating and Distributing Electricity (4110)	77.0
2.	<sup>b</sup> - Copper Ore Mining (2130)	68.0
3.	<sup>b</sup> - Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	67.5
4.	<sup>b</sup> - Nickel Ore Mining (2140)	67.0
5.	<sup>b</sup> - Manufacture of Desiccated Coconut (3125)	65.0
6.	<sup>b</sup> - Manufacture of Desiccated Coconut (3125)	64.5
7.	<sup>b</sup> - Distilling, Rectifying, and Blending Spirits (3131)	64.0
8.	<sup>b</sup> - Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	64.0
9.	<sup>b</sup> - Sugar Milling and Refining (3123)	61.0
10.	<sup>b</sup> - Manufacture of Desiccated Coconut (3125)	58.5
11.	- Chromite Ore Mining (2150)	
12.	- Petroleum Refineries (3530)	56.5
13.	- Generating and Distributing Electricity (4110)	54.0
14.	- Generating and Distributing Electricity (4110)	
15.	<sup>b</sup> - Distilling, Rectifying, and Blending Spirits (3131) - Manufacture of Electric Wires and Wiring Devices (3836)	53.5

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 5A - TOP 10 RANKING INDUSTRIES: REGION 5**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Sugar Milling and Refining (3123)	1/1	66.5*
2.	Generating and Distributing Electricity (4110)	4/30	65.1
3.	Coal Mining (2210)	1/1	65.0*
4.	Gold Ore Mining (2110)	3/5	63.3
5.	Manufacture of Pulp, Paper, and Paperboard (3411)	2/2	57.0
6.	Petroleum and Petroleum Products, Wholesaling (6180)	3/3	45.2
7.	Production of Crude Coconut Oil, Including Cake and Meal (3116)	2/2	44.0
8.	Soft Drink and Carbonated Water Manufacturing (3134)	2/2	43.5
9.	Slaughtering, Preparing, and Preserving Meat (3111)	5/7	41.3
10.	Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	3/7	41.2

\* Industrial average based on the score of an individual facility.

**TABLE 5B - TOP 15 RANKING FACILITIES: REGION 5**

	Facility Category* (NEDA Classification Code)	NRIPS Score
1.	<sup>b</sup> - Generating and Distributing Electricity (4110)	79.5
2.	<sup>b</sup> - Generating and Distributing Electricity (4110)	71.0
3.	<sup>b</sup> - Gold Ore Mining (2110)	68.0
4.	- Sugar Milling and Refining (3123)	66.5
5.	<sup>b</sup> - Manufacture of Pulp, Paper, and Paperboard (3411)	66.0
6.	- Coal Mining (2210)	65.0
7.	<sup>b</sup> - Gold Ore Mining (2110)	64.0
8.	- Generating and Distributing Electricity (4110)	58.0
9.	<sup>b</sup> - Gold Ore Mining (2110)	
10.	- Petroleum and Petroleum Products, Wholesaling (6180)	55.5
11.	- Production of Crude Coconut Oil, Including Cake and Meal (3116)	
12.	- Barge Diesel Power Barge - Generating and Distributing Electricity (4110)	52.0
13.	- Slaughtering, Preparing, and Preserving Meat (3111)	48.0
14.	- Manufacture of Pulp, Paper, and Paperboard (3411)	
15.	- Manufacture of Bakery Products (3122)	47.5
16.	- Slaughtering, Preparing, and Preserving Meat (3111)	

\* Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 6A - TOP 10 RANKING INDUSTRIES: REGION 6**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Coal Mining (2210)	1/1	86.0*
2.	Distilling, Rectifying, and Blending Spirits (3131)	3/3	67.3
3.	Spinning, Weaving, Texturizing, and Finishing Textiles (3211)	1/1	65.0*
4.	Copper Ore Mining (2130)	1/1	63.5*
4.	Sugar Milling and Refining (3123)	20/21	63.5
6.	Malt Liquors and Malt (3133)	1/1	53.0
7.	Non-Ferrous Foundries (3724)	3/3	50.3
8.	Food Manufacturing, Not Elsewhere Classified (3129)	1/8	50.0
9.	Generating and Distributing Electricity (4110)	3/8	49.8
10.	Slaughtering, Preparing, and Preserving Meat (3111)	1/8	48.5

\* Industry average based on the score of an individual facility.

**TABLE 6B - TOP 15 RANKING FACILITIES: REGION 6**

	Facility Category* (NEDA Classification Code)	NRIPS Score
1.	- Coal Mining (2210)	86.0
2.	- Sugar Milling and Refining (3123)	77.5
3.	- Sugar Milling and Refining (3123)	71.0
4.	- Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	70.0
5.	- Sugar Milling and Refining (3123)	
6.	- Sugar Milling and Refining (3123)	69.5
7.	- Sugar Milling and Refining (3123)	68.0
8.	- Hog Raising (1213)	67.5
9.	- Sugar Milling and Refining (3123)	
10.	<sup>b</sup> - Distilling, Rectifying, and Blending Spirits (3131)	67.0
11.	<sup>b</sup> - Sugar Milling and Refining (3123)	66.0
12.	<sup>b</sup> - Distilling, Rectifying, and Blending Spirits (3131)	65.5
13.	- Sugar Milling and Refining (3123)	65.0
14.	- Sugar Milling and Refining (3123)	
15.	- Spinning, Weaving, Texturizing, and Finishing of Textiles (3211)	

\* Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 7A - TOP 10 RANKING INDUSTRIES: REGION 7**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Malt and Malt Liquors (3133)	1/1	49.5
2.	Food Manufacturing, Not Elsewhere Classified (3129)	3/3	47.5
3.	Manufacture of Vegetable and Animal Oils and Fats (3117)	2/5	47.0
4.	Sugar Milling and Refining (3123)	3/3	46.5
5.	Manufacture of Electric Wires and Wiring Devices (3836)	2/2	46.0
6.	Storage and Warehousing, Not Elsewhere Classified (7209)	3/3	45.2
7.	Manufacture of Wood, Cork, and Cane Products, Not Elsewhere Classified (3319)	3/3	44.8
8.	Manufacture of Cement (3630)	2/2	44.5
9.	Manufacture of Drugs and Medicines (3522)	1/1	42.5*
10.	Manufacture of Watches and Clocks (3853)	1/1	41.0*

\* Industry average based on the score of an individual facility.

**TABLE 7B - TOP 15 RANKING FACILITIES: REGION 7**

	Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1.	- Food Manufacturing, Not Elsewhere Classified (3129)	60.5
2.	- Shipbuilding and Repairing (3841)	60.0
3.	<sup>b</sup> - Slaughtering, Preparing, and Preserving Meat (3111)	57.5
4.	- Hog Raising (1213)	
5.	<sup>b</sup> - Manufacture of Fertilizers (3512)	
6.	- Manufacture of Chemical Products, Not Elsewhere Classified (3529)	55.5
7.	- Storage and Warehousing, Not Elsewhere Classified (7209)	
8.	<sup>b</sup> - Hog Raising (1213)	55.0
9.	- Manufacture of Vegetable and Animal Oils and Fats (3117)	
10.	<sup>b</sup> - Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	54.0
11.	- Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	
12.	- Generation and Distribution of Electricity (4110)	
13.	- Food Manufacturing, Not Elsewhere Classified (3129)	53.0
14.	- Steel Works and Rolling Mills (3712)	52.0
15.	<sup>b</sup> - Manufacture of Cement (3630)	51.0
16.	- Manufacture of Wood and Wood Products, Not Elsewhere Classified (3319)	

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

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**TABLE 8A - TOP 10 RANKING INDUSTRIES: REGION 8**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Non-Ferrous Smelting and Refining Plant, Except Precious Metals (3722)	2/2	74.0
2.	Manufacture of Fertilizers (3512)	1/1	68.0 <sup>a</sup>
3.	Coal Mining (2210)	2/3	67.0
4.	Distilling, Rectifying, and Blending Spirits (3131)	1/1	62.5 <sup>a</sup>
5.	Chromite Ore Mining (2150)	1/2	58.0 <sup>a</sup>
6.	Sugar Milling and Refining (3123)	2/2	56.5
7.	Steam Heat and Power Plants (4220)	1/1	54.5 <sup>a</sup>
8.	Nickel Ore Mining (2140)	1/3	50.0 <sup>a</sup>
9.	Chemical and Fertilizer Mineral Mining (2291)	1/1	48.5 <sup>a</sup>
10.	Millwork Plants (3315)	1/1	47.5 <sup>a</sup>

<sup>a</sup> Industry average based on the score of an individual facility.

**TABLE 8B - TOP 15 RANKING FACILITIES: REGION 8**

	Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1.	<sup>b</sup> - Non-Ferrous Smelting and Refining Plant, Except Precious Metals (3722)	75.0
2.	<sup>b</sup> - Non-Ferrous Smelting and Refining Plant, Except Precious Metals (3722)	73.0
3.	- Coal Mining (2210)	68.5
4.	<sup>b</sup> - Manufacture of Fertilizers (3512)	68.0
5.	- Coal Mining (2210)	65.5
6.	<sup>b</sup> - Sugar Milling and Refining (3123)	64.0
7.	<sup>b</sup> - Distilling, Rectifying, and Blending Spirits (3131)	62.5
8.	- Chromite Ore Mining (2150)	58.0
9.	<sup>b</sup> - Steam Heat and Power Plants (4220)	54.5
10.	- Soft Drink and Carbonated Beverage Manufacturing (3134)	51.0
11.	- Production of Crude Coconut Oil, Including Cake and Meal (3116)	50.5
12.	- Nickel Ore Mining (2140)	50.0
13.	- Manufacture of Cutlery, Handtools, and General Hardware (3811)	48.5
14.	<sup>b</sup> - Chemical and Fertilizer Mineral Mining (2291)	
15.	- Millwork Plants (3315)	47.5
16.	- Chicken Raising (1221)	

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 9A - TOP 10 RANKING INDUSTRIES: REGION 9**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Gold Ore Mining (2110)	3/8	60.7
2.	Gold and Other Precious Metal Refining (3721)	1/1	59.5*
3.	Manufacture of Vegetable and Animal Oils and Fats (3117)	7/7	52.1
4.	Manufacture of Rubber Products, Not Elsewhere Classified (3559)	14/16	50.9
5.	Soft Drinks and Carbonated Water Manufacturing (3134)	2/2	50.5
6.	Iron and Steel Foundries (3713)	1/1	45.0*
7.	Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	7/17	44.9
8.	Manufacture of Basic Industrial Chemicals, Except Fertilizers (3511)	2/2	44.5
9.	Manufacture of Synthetic Resins, Plastic Material, and Man-Made Fiber, Except Glass (3513)	1/1	43.5*
10.	Generating and Distributing Electricity (4110)	1/9	43.0*

\* Industry average based on the score of an individual facility.

**TABLE 9B - TOP 15 RANKING FACILITIES: REGION 9**

	Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1.	<sup>b</sup> - Gold Ore Mining (2110)	68.0
2.	<sup>b</sup> - Manufacture of Rubber Products, Not Elsewhere Classified (3559)	63.0
3.	<sup>b</sup> - Production of Crude Coconut Oil, Including Cake and Meal (3116)	61.5
4.	<sup>b</sup> - Gold and Other Precious Metal Refining (3721)	59.5
5.	<sup>b</sup> - Gold Ore Mining (2110)	58.0
6.	<sup>b</sup> - Manufacture of Vegetable and Animal Oils and Fats (3117)	57.0
7.	<sup>b</sup> - Gold Ore Mining (2110)	56.0
8.	<sup>b</sup> - Manufacture of Rubber Products, Not Elsewhere Classified (3559)	55.5
9.	<sup>b</sup> - Manufacture of Rubber Products, Not Elsewhere Classified (3559)	55.0
10.	- Manufacture of Rubber Products, Not Elsewhere Classified (3559)	
11.	<sup>b</sup> - Manufacture of Vegetable and Animal Oils and Fats (3117)	54.5
12.	<sup>b</sup> - Manufacture of Vegetable and Animal Oils and Fats (3117)	54.0
13.	<sup>b</sup> - Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	
14.	- Manufacture of Rubber Products, Not Elsewhere Classified (3559)	53.5
15.	- Manufacture of Rubber Products, Not Elsewhere Classified (3559)	53.0

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 10A - TOP 10 RANKING INDUSTRIES: REGION 10**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Gold Ore Mining (2110)	2/2	71.5
2.	Manufacture of Soap and Cleaning Preparations, Perfumes, Cosmetics, and Other Toilet Preparations (3523)	1/1	69.0*
3.	Sugar Milling and Refining (3123)	2/2	62.0
4.	Manufacture of Desiccated Coconut (3125)	2/2	58.0
5.	Food Manufacturing, Not Elsewhere Classified (3129)	2/2	57.8
6.	Malt Liquors and Malt (3133)	1/1	56.0*
7.	Gold and Other Precious Metal Refining (3721)	3/3	55.7
8.	Manufacture of Synthetic Resins, Plastic Material, and Man-Made Fiber Except Glass (3513)	1/1	53.0*
9.	Steel Works and Rolling Mills (3712)	5/5	52.9
10.	Blast Furnaces and Steel-Making Furnaces (3711)	1/1	52.5*

\* Industry average based on the score of an individual facility.

**TABLE 10B - TOP 15 RANKING FACILITIES: REGION 10**

	Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1.	<sup>b</sup> - Gold Ore Mining (2110)	72.0
2.	<sup>b</sup> - Gold Ore Mining (2110)	71.0
3.	<sup>b</sup> - Gold and Other Precious Metal Refining (3721)	69.5
4.	- Manufacture of Soap and Cleaning Preparations, Perfumes, Cosmetics, and Other Toilet Preparations (3523)	69.0
5.	<sup>b</sup> - Canning and Preserving of Fruits and Vegetables (3114)	65.0
6.	- Gold and Other Precious Metal Refining (3721)	64.0
7.	- Manufacture of Desiccated Coconut (3125)	63.5
8.	- Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	62.0
9.	- Sugar Milling and Refining (3123)	61.5
10.	<sup>b</sup> - Steel Works and Rolling Mills (3712)	61.5
11.	- Manufacture of Desiccated Coconut (3125)	60.5
12.	- Food Manufacturing, Not Elsewhere Classified (3129)	60.0
13.	<sup>b</sup> - Sugar Milling and Refining (3123)	58.0
14.	- Nickel Ore Mining (2140)	58.0
15.	- Manufacture of Vegetable and Animal Oils and Fats (3117)	57.0

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility is also included on the regional DENR list of most pollutive facilities.

**TABLE 11A - TOP 10 RANKING INDUSTRIES: REGION 11**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Manufacture of Cement (3630)	1/1	62.5*
2.	Sugar Milling and Refining (3123)	1/1	59.5*
3.	Manufacture of Pulp, Paper, and Paperboard (3411)	3/3	55.5
4.	Manufacture of Synthetic Resins, Plastic Material, and Man-Made Fiber, Except Glass (3513)	1/1	52.5*
4.	Hotels, Motels, and Other Lodging Places (9820)	1/1	52.5*
6.	Iron and Steel Foundries (3713)	1/1	51.5*
7.	Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	8/8	50.8
8.	Gold and Other Precious Metal Refining (3721)	29/29	48.8
9.	Manufacture of Basic Industrial Chemicals, Except Fertilizers (3511)	7/7	48.6
10.	Coal Mining (2210)	1/1	48.5*

\* Industry average based on the score of an individual facility.

**TABLE 11B - TOP 15 RANKING FACILITIES: REGION 11**

	Facility Category <sup>a</sup> (NEDA Classification Code)	NRIPS Score
1.	(Chemical Recovery) <sup>b</sup> - Manufacture of Basic Industrial Chemicals, Except Fertilizer (3511)	67.5
2.	<sup>b</sup> - Manufacture of Cement (3630)	62.5
3.	(Pulp) <sup>b</sup> - Manufacture of Pulp, Paper, and Paperboard (3411)	61.0
4.	<sup>b</sup> - Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	59.5
5.	<sup>b</sup> - Sugar Milling and Refining (3123)	
6.	(Chemical) <sup>b</sup> - Manufacture of Basic Industrial Chemicals, Except Fertilizers (3511)	58.0
7.	(Power Plant) <sup>b</sup> - Generating and Distributing Electricity (4110)	57.5
8.	(Paper) <sup>b</sup> - Manufacture of Pulp, Paper, and Paperboard (3411)	57.0
9.	- Hog Raising (1213)	56.5
10.	- Gold and Other Precious Metal Refining (3721)	56.0
11.	<sup>b</sup> - Manufacture of Desiccated Coconut (3125)	55.0
12.	- Gold and Other Precious Metal Refining (3721)	
13.	- Hog Raising (1213)	54.5
	<sup>b</sup> - Hog Raising (1213)	
	- Gold and Other Precious Metal Refining (3721)	

<sup>a</sup> Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 12A - TOP 10 RANKING INDUSTRIES: REGION 12**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Steam Heat and Power Plants (4220)	1/1	74.5*
2.	Manufacture of Cement (3630)	2/2	72.8
3.	Manufacture of Synthetic Resins, Plastic Material, and Man-Made Fiber, Except Glass (3513)	2/2	70.0
4.	Steel Works and Rolling Mills (3712)	1/1	68.0*
5.	Manufacture of Pulp, Paper, and Paperboard (3411)	1/1	65.0*
6.	Manufacture of Fertilizers (3512)	1/1	64.5*
7.	Flour Milling, Except Cassava (3119)	1/1	54.0*
7.	Food Manufacturing, Not Elsewhere Classified (3129)	1/3	54.0*
9.	Manufacture of Rubber Products Not Elsewhere Classified (3559)	15/26	50.5
10.	Manufacture of Vegetable and Animal Oils and Fats (3117)	4/4	50.4

\*Industry average based on the score of an individual facility.

**TABLE 12B - TOP 15 RANKING FACILITIES: REGION 12**

	Facility Category* (NEDA Classification Code)	NRIPS Score
1.	<sup>b</sup> - Steam Heat and Power Plants (4220)	74.5
2.	- Manufacture of Synthetic Resins, Plastic Material, and Man-Made Fiber, Except Glass (3513)	73.0
3.	<sup>b</sup> - Manufacture of Cement (3630)	72.5
4.	<sup>b</sup> - Manufacture of Cement (3630)	72.5
5.	- Steel Works and Rolling Mills (3712)	68.0
6.	<sup>b</sup> - Manufacture of Synthetic Resins, Plastic Material, and Man-Made Fiber, Except Glass (3513)	67.0
7.	- Manufacture of Pulp, Paper, and Paperboard (3411)	65.0
8.	- Manufacture of Fertilizers (3512)	64.5
9.	- Manufacture of Rubber Products, Not Elsewhere Classified (3559)	60.0
10.	- Manufacture of Rubber Products, Not Elsewhere Classified (3559)	56.5
11.	- Manufacture of Vegetable and Animal Oils and Fats (3117)	54.5
12.	<sup>b</sup> - Manufacture of Rubber Products, Not Elsewhere Classified (3559)	54.0
13.	<sup>b</sup> - Food Manufacturing, Not Elsewhere Classified (3129)	54.0
14.	<sup>b</sup> - Flour Milling, Except Cassava (3119)	54.0
15.	- Hog Raising (1213)	53.5

\* Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 13A - TOP 10 RANKING INDUSTRIES: NATIONAL CAPITAL REGION**

Industrial Category or Subcategory (NEDA Classification Code)		Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Manufacture of Dairy Products, Except Milk (3113)	1/1	55.0*
1.	Malt Liquors and Malt (3133)	1/1	55.0*
3.	Tanneries and Leather Finishing (3231)	1/1	54.0*
4.	Manufacture of Pulp, Paper, and Paperboard (3411)	4/7	52.5
4.	Manufacture of Motorcycles and Bicycles (3846)	1/1	52.5*
4.	Sanitary and Similar Services (9200)	1/1	52.5*
7.	Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	15/15	51.2
8.	Spinning, Weaving, Texturizing, and Finishing Textiles (3211)	8/8	51.1
9.	Knitting Mills (3212)	6/6	50.6
10.	Manufacture of Electrical Apparatus and Supplies, Not Elsewhere Classified (3839)	1/1	50.5*
10.	Petroleum Refineries (3530)	3/3	50.5

\* Industry average based on the score of an individual facility.

**TABLE 13B - TOP 15 RANKING FACILITIES:  
NATIONAL CAPITAL REGION**

Facility Category* (NEDA Classification Code)		NRIPS Score
1.	- Slaughtering, Preparing, and Preserving Meat (3111)	66.0
2.	- Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	64.5
3.	- Petroleum Refineries (3530)	62.0
4.	- Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	60.5
5.	- Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	59.5
6.	- Knitting Mills (3212)	58.5
7.	- Manufacture of Primary Cells and Batteries (3834)	58.0
8.	- Manufacture of Pulp, Paper, and Paperboard (341)	
9.	- Manufacture of Vegetable and Animal Oils and Fats (3117)	
10.	- Steel Works and Rolling Mills (3712)	57.5
11.	- Manufacture of Dairy Products, Except Milk (3113)	57.0
12.	- Knitting Mills (3212)	
13.	- Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	56.0
14.	- Steel Works and Rolling Mills (3712)	
15.	- Manufacture of Fabricated Wire Products (3815)	

\* Facility names are classified information.

**TABLE 14A - TOP 10 RANKING INDUSTRIES:  
CORDILLERA ADMINISTRATIVE REGION**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Gold Ore Mining (2110)	6/6	66.8
2.	Sanitary and Similar Services (9200)	2/2	58.5
3.	Manufacture of Electrical Industrial Machinery and Apparatus (3836)	1/1	55.0*
4.	Hog Raising (1213)	4/4	48.3
5.	Limestone Quarrying (2231)	1/1	45.5
6.	Manufacture of Machinery and Equipment, Except Electrical, Not Elsewhere Classified (3829)	3/3	41.3
7.	Motor Vehicle Body Repair Shops, Including Upholstery and Repainting (9712)	1/1	40.5*
8.	Manufacture of Bakery Products (3122)	5/5	40.1
9.	Food Manufacturing, Not Elsewhere Classified (3129)	4/4	37.0
10.	Chicken Raising (1221)	5/5	36.6

\* Industry average based on the score of an individual facility.

**TABLE 14B - TOP 15 RANKING FACILITIES:  
CORDILLERA ADMINISTRATIVE REGION**

	Facility Category* (NEDA Classification Code)	NRIPS Score
1.	<sup>b</sup> - Gold Ore Mining (2110)	77.5
2.	<sup>b</sup> - Gold Ore Mining (1213)	77.0
3.	<sup>b</sup> - Gold Ore Mining (2110)	74.5
4.	<sup>b</sup> - Gold Ore Mining (2110)	74.0
5.	<sup>b</sup> - Gold Ore Mining (2110)	65.0
6.	<sup>b</sup> - Sanitary and Similar Services (9200)	64.5
7.	<sup>b</sup> - Hog Raising (1213)	60.0
8.	<sup>b</sup> - Manufacture of Electrical Industrial Machinery and Apparatus (3836)	55.0
9.	<sup>b</sup> - Sanitary and Similar Services (9200)	52.5
10.	<sup>b</sup> - Manufacture of Machinery and Equipment, Except Electrical, Not Elsewhere Classified (3829)	51.0
11.	- Hog Raising (1213)	48.5
12.	- Manufacture of Bakery Products (3122)	48.0
13.	<sup>b</sup> - Farm, Forest, and Marine Products, Wholesaling (6110)	47.5
14.	- Food Manufacturing, Not Elsewhere Classified (3129)	46.0
15.	<sup>b</sup> - Limestone Quarrying (2231)	45.5

\* Facility names are classified information.

<sup>b</sup> This facility also is included on the regional DENR list of most pollutive facilities.

**TABLE 15A - TOP 10 RANKING INDUSTRIES:  
LAGUNA LAKE DEVELOPMENT AUTHORITY**

	Industrial Category or Subcategory (NEDA Classification Code)	Number of Facilities Scored/Files Identified	Average NRIPS Score per Facility
1.	Manufacture of Desiccated Coconut (3125)	2/3	56.5
2.	Generating and Distributing Electricity (4110)	1/3	56.5*
3.	Manufacture of Pulp, Paper, and Paperboard (3411)	10/13	55.7
4.	Malt Liquors and Malt (3133)	1/2	54.5*
5.	Steam Heat and Power Plants (4220)	1/1	53.5*
6.	Manufacture of Cement (3630)	2/4	52.8
7.	Manufacture of Carpets and Rugs (3214)	2/7	51.3
8.	Manufacture of Soap and Cleaning Preparations, Perfumes, Cosmetics, and Other Toilet Preparations (3523)	8/8	49.3
9.	Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	11/11	48.7
10.	Manufacture of Primary Cells and Batteries (3834)	3/3	48.3

\* Industry average based on the score of an individual facility.

**TABLE 15B - TOP 15 RANKING FACILITIES:  
LAGUNA LAKE DEVELOPMENT AUTHORITY**

	Facility Category * (NEDA Classification Code)	NRIPS Score
1.	- Manufacture of Soap and Cleaning Preparations, Perfumes, Cosmetics, and Other Toilet Preparations (3523)	74.0
2.	- Manufacture of Pulp, Paper, and Paperboard (3411)	71.0
3.	- Manufacture of Basic Industrial Chemicals, Except Fertilizers (3511)	68.0
4.	- Tire and Tube Manufacturing (3551)	64.5
5.	- Manufacture of Basic Industrial Chemicals, Except Fertilizers (3511)	
6.	- Spinning, Weaving, Texturizing, and Finishing Textiles (3211)	
7.	- Manufacture of Pulp, Paper, and Paperboard (3411)	64.0
8.	- Laundries, Laundry Services, and Cleaning and Dyeing Plants (9730)	
9.	- Canning, Preserving, and Processing of Fish, Crustacea, and Other Seafood (3115)	63.5
10.	- Manufacture of Desiccated Coconut (3125)	
11.	- Manufacture of Pulp, Paper, and Paperboard (3411)	63.0
12.	- Manufacture of Soap and Cleaning Preparations, Perfumes, Cosmetics, and Other Toilet Preparations (3523)	62.0
13.	- Spinning, Weaving, Texturizing, and Finishing Textiles (3211)	61.5
14.	- Spinning, Weaving, Texturizing, and Finishing Textiles (3211)	
15.	- Non-Ferrous Smelting and Refining Plant, Except Precious Metals (3722)	60.5

\* Facility names are classified information.

## Appendix G

### Pollution Management Appraisal Workshops

Date	Venue	No. of Participants
October 12 - 16, 1992	U. P. National Engineering Center, Diliman, Quezon City	52
February 15 - 18, 1993	Sulo Hotel, Quezon City	26
August 9 - 12, 1993	Apo View Hotel, Davao City	64
October 11 - 14, 1993	Bulakena by the Bay, Cagayan de Oro City	31
February 21 - 24, 1994	Costabella Beach Hotel, Cebu	46
May 3 - 6, 1994	Legend Hotel, Mandaluyong City	32
July 19 - 21, 1994	Garden Orchid Hotel, Zamboanga City	38
July 27 - 28, 1994	Marvella Plaza Hotel, Koronadal, South Cotabato	29
September 28 - 30, 1994	Sarabia Manor Hotel, Iloilo City	52
October 12 - 14, 1994	Hyatt Regency Hotel, Manila	31
February 21 - 23, 1995	Don Felipe Hotel, Ormoc City, Leyte	46
February 27 - March 2, 1995	Dynasty Court Hotel, Cagayan de Oro City	93
March 8 - 10, 1995	Casa Luisa Restaurant, General Santos City	26
May 2 - 5, 1995	Sulo Hotel, Quezon City	50
July 18 - 21, 1995	Alicia Hotel, Legaspi City	30
August 29 - 30, 1995	Villa Cristina Hotel, Antipolo, Rizal	47
September 26 - 29, 1995	Montebello Villa Hotel, Cebu	52
October 3 - 6, 1995	Apo View Hotel, Davao	54
October 10 - 12, 1995	Montebello Villa Hotel, Cebu	52
January 23 - 26, 1996	Traders Hotel, Manila	45
February 6 - 9, 1996	Club John Hay, Baguio	32
April 10 - 12, 1996	L'Fisher Hotel, Bacolod City	39
May 15 - 17, 1996	Alpha Hotel, Batangas City	27

## Appendix H Other Iemp Workshops Conducted

No.	Date	Venue	# of Participants
<b>Environmental Impact Assessment Workshop (EIAW)</b>			
1	February 8-12, 1994	Agoo Playa Hotel, Agoo, La Union	22
2	April 15-16, 1993	Las Brisas Hotel, Antipolo, Rizal	20
3	November 8-12, 1993	Costabella Beach Hotel, Cebu	63
4	November 22-26, 1993	Pryce Plaza Hotel, Cagayan de Oro City	74
5	June 27-30, 1994	Legend Hotel, Mandaluyong, Metro Manila	51
6	July 4-7, 1994	Legend Hotel, Mandaluyong, Metro Manila	67
7	April 24-27, 1995	Green Valley Country Club, Baguio	158
8	May 15-18, 1995	Pryce Plaza Hotel, Cagayan de Oro City	51
	May 15-19, 1995 (Scoping Workshop)	Pryce Plaza Hotel, Cagayan de Oro City	68
9	June 5-8, 1995	Sydney Hotel, General Santos City	48
	June 5-8, 1995 (Scoping Workshop)	Sydney Hotel, General Santos City	72
10	August 15-18, 1995	Montebello Hotel, Cebu City	51
11	September 12-15, 1995	DAP, Tagaytay, Cavite	46
<b>TOTAL</b>			<b>771</b>
<b>Environmental Risk Assessment Workshop (ERAW)</b>			
1	February 22-26, 1993	Imus Sports Center, Imus, Cavite	31
2	November 15-19, 1993	Legend Hotel, Mandaluyong, Metro Manila	39
3	May 16-19, 1994	Legend Hotel, Mandaluyong, Metro Manila	19
4	May 23-26, 1994	Park Place Hotel, Cebu City	16
5	September 20-23, 1994	Taal Vista Hotel, Tagaytay City	39
<b>TOTAL</b>			<b>140</b>
<b>Compliance Monitoring Workshop (CMW)</b>			
1	May 3-7, 1993	Institute of Forest Conservation, U.P. Los Banos, Laguna	31
2	October 18-22, 1993	Taal Vista Hotel, Tagaytay City	32
3	March 14-18, 1994	Caylabne Bay Hotel, Ternate, Cavite	28
4	November 14-18, 1994	Montebello Villa Hotel, Cebu City	30

No.	Date	Venue	# of Participants
5	March 20-24, 1995	Caylabne Bay Resort, Ternate, Cavite	62
6	November 20-24, 1995	Insular Century Hotel, Davao City	47
7	April 22-25, 1996	Montebello Villa Hotel, Cebu City	48
<b>TOTAL</b>			<b>278</b>
<b>Data Collection, Sampling, and Sample Analysis Workshop (DCSSAW)</b>			
1	June 21-25, 1993	Montebello Villa Hotel, Cebu City	32
2	October 25-29, 1993	Sulo Hotel, Quezon City	38
3	March 21-25, 1994	Sulo Hotel, Quezon City	26
4	December 5-9, 1994	Sulo Hotel, Quezon City	29
5	July 31-August 4, 1995	Innotech, Quezon City	48
6	March 4-8, 1996	Innotech, Quezon City	27
<b>TOTAL</b>			<b>200</b>
<b>Compliance Audit Workshop (CAW)</b>			
1	November 3-6, 1993	Sulo Hotel, Quezon City	44
2	November 3-5, 1994	Montebello Villa Hotel	44
3	April 4-7, 1995	Apo View Hotel, Davao	29
4	June 20-23, 1995	Amigo Terrace Hotel, Iloilo	47
5	November 13-16, 1995	Hotel Supreme, Baguio City	41
6	November 8-10, 1995	Department of Energy, Makati	19
<b>TOTAL</b>			<b>225</b>
<b>Train the Trainer Workshop (TTW)</b>			
1	December 1-3, 1994	Legend Hotel, Mandaluyong, Metro Manila	21
2	December 5-7, 1994	Legend Hotel, Mandaluyong, Metro Manila	21
3	July 25-28, 1995	Montebello Hotel, Cebu	43
4	September 5-8, 1995	Villa Cristina Hotel, Antipolo, Rizal	23
<b>TOTAL</b>			<b>112</b>
<b>Industry Seminar (IS)</b>			
1	November 1992	Hyatt Regency Hotel, Manila	291
2	January 27, 1993	Antipolo (Rizal Hog Raisers Association)	30
3	March 6, 1993	Bulacan (Meycauayan Tanners Cooperative Council)	30
4	April 30, 1993	Metro Manila (Pollution Control Association of the Philippines, Inc.)	
5	June 1993	General Santos City	78

No.	Date	Venue	# of Participants
6	October 1993	Cebu (Philippine Institute of Chemical Engineers)	105
7	February 10-11, 1994	Bacolod (Philippine Sugar Millers Association)	34
8	March 9, 1994	Gloan's, Angeles City	75
8	May 7, 1994	Zamboanga City (Industry Association of Zamboanga)	
9	June 18, 1994	Garden Orchid Hotel, Zamboanga City	64
10	February 24, 1995	Leyte Industrial Development Estate, Isabel, Leyte	77
11	March 30, 1995	Traders Hotel, Manila	60
12	June 15, 1995	Mayon International Hotel, Bicol	112
13	August 9, 1995	Davao Insular Hotel, Davao City	56
14	August 11, 1995	Cebu Plaza Hotel, Cebu City	72
15	December 5, 1995	Partyland, San Fernando, Pampanga	53
	<b>TOTAL</b>		<b>1185</b>

## Appendix I

### List of Iemp Local Resource Persons

Resource Person	Affiliation	Expertise	Workshop Involved
1. Victor S. Luis, Jr.	PRC EMI	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> <li>• Biology</li> <li>• Water and Solid Waste Management</li> <li>• Wastewater treatment</li> <li>• Hazardous Waste Management</li> </ul>	PMA CA RA 6969
2. Marlito L. Cardenas	PRC EMI	<ul style="list-style-type: none"> <li>• Agricultural Chemistry; Soil Science</li> <li>• Ecological Chemistry</li> <li>• EIA</li> </ul>	EIA
3. Raul Roberto de Guzman	EPAI-WWC	<ul style="list-style-type: none"> <li>• Business Economics</li> <li>• Business Administration</li> </ul>	PMA EIA
4. Ma. Victoria Guina	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• EIA</li> <li>• Environmental Audit</li> <li>• Wastewater Treatment design</li> <li>• PMA</li> </ul>	PMA
5. Francisco A. Arellano	UPERDFI	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Environmental Engineering</li> <li>• EIA</li> </ul>	PMA DCSSA EIA
6. Ronilo B. Suazo	Independent Consultant	<ul style="list-style-type: none"> <li>• Agriculture Engineering</li> <li>• Environmental Engineering</li> <li>• Water Quality Monitoring</li> <li>• EIA</li> <li>• Wastewater Characterization</li> </ul>	PMA
7. Marivic Cepeda	PRC EMI	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> <li>• EIA</li> <li>• Waste Minimization</li> <li>• Hazardous Waste Management</li> </ul>	DCSSA PMA EIA RA6969

Resource Person	Affiliation	Expertise	Workshop Involved
8. Leonard Faller	PRC EMI	<ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• Water Quality Monitoring</li> <li>• EIA</li> <li>• Hazardous Waste Management</li> <li>• Waste Minimization</li> </ul>	PMA EIA CA/CM RA 6969
9. Ruel Janolino	SKI	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Environmental Engineering</li> <li>• Noise Pollution Control</li> <li>• Environmental Project Management</li> <li>• Comprehensive EIA</li> <li>• PMA</li> <li>• Water Quality Monitoring</li> </ul>	PMA EIA CA
10. Juliana Urquía	SKI	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Water Quality</li> <li>• Waste Minimization</li> </ul>	PMA CA
11. William Matuguina	Independent Consultant	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Environmental Audits</li> <li>• Pollution Management</li> <li>• Water Quality</li> <li>• Wastewater Treatment</li> </ul>	CA
12. Edgardo Alpay	SKI	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Environmental Engineering</li> <li>• Wastewater Treatment Plant Design</li> <li>• EIA</li> <li>• Environmental Audit</li> </ul>	CM CA
13. Daisy Sañoza	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemistry</li> <li>• Plant Audits</li> </ul>	CA
14. Marissa David	PRC EMI	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• PMA</li> <li>• Hazardous Waste Management</li> <li>• Waste Minimization</li> </ul>	PMA CA CM RA 6969

Resource Person	Affiliation	Expertise	Workshop Involved
15. Chona B. Cristobal	PRC EMI	<ul style="list-style-type: none"> <li>• Hazardous Waste Management</li> <li>• Wastewater Treatment</li> </ul>	RA 6969
16. Amira Goki	PRC EMI	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• PMA</li> <li>• Waste Minimization</li> <li>• Water Quality Monitoring</li> </ul>	PMA CA CM DCSSA
17. Israel Bentillo	EPAI-WWC	<ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• Meteorology</li> <li>• EIA</li> </ul>	CM
18. Ma. Lourdes McGlone	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemistry</li> <li>• Oceanography</li> <li>• Chemical Oceanography</li> </ul>	CA
19. Alejo P. Manaloto	EPAI-WWC	<ul style="list-style-type: none"> <li>• Mechanical Engineering</li> <li>• Business Administration</li> <li>• Air Quality</li> </ul>	CM
20. Antonio Tria	EPAI-WWC	<ul style="list-style-type: none"> <li>• Environmental Law</li> </ul>	CM CA
21. Gray Lopez	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• EIA</li> <li>• Industry Quality Audits</li> </ul>	CM CA
22. Elizabeth Ignacio	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Laboratory Work</li> <li>• Field sampling analysis</li> <li>• EIA and PMA</li> </ul>	DCSSA
23. Honorata de Leon	Independent Consultant	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Statistics</li> <li>• Baseline data collection</li> </ul>	DCSSA
24. Eloly de Jesus	PRC EMI	<ul style="list-style-type: none"> <li>• Chemistry</li> <li>• PMA</li> <li>• Waste Minimization</li> <li>• Sampling and Analysis</li> <li>• Air Quality Monitoring</li> </ul>	PMA CA CM DCSSA

Resource Person	Affiliation	Expertise	Workshop Involved
25. Edgar de Jesus	PRC EMI	<ul style="list-style-type: none"> <li>• Biology</li> <li>• Baseline Data Collection</li> <li>• Field Sampling</li> <li>• Water Quality Monitoring</li> </ul>	PMA DCSSA
26. Rodrigo Badayos	EPAI-WWC	<ul style="list-style-type: none"> <li>• Agriculture</li> <li>• Soil science</li> <li>• Marine pollution</li> <li>• Soil resources and management</li> </ul>	DCSSA
27. Jorge C. Ponce	SKI	<ul style="list-style-type: none"> <li>• Civil &amp; Sanitary Engineering</li> <li>• EIA</li> <li>• Design of water supply and wastewater treatment facilities</li> </ul>	DCSSA EIA
28. Emmanuel Anglo	EPAI-WWC	<ul style="list-style-type: none"> <li>• Philosophy</li> <li>• Meteorology</li> <li>• EIA</li> <li>• Air quality management</li> <li>• Air quality sampling</li> </ul>	DCSSA CA CM
29. Gil Jacinto	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemistry</li> <li>• Oceanography</li> <li>• Marine Chemistry</li> <li>• Marine environment</li> </ul>	DCSSA
30. Edna E. Pascual	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemistry</li> <li>• Health and Environmental Management</li> <li>• Industrial hygiene</li> </ul>	ERA
31. Restituto Cabrera, Jr.	EPAI-WWC	<ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• Risk Engineering</li> <li>• Risk insurance</li> </ul>	ERA
32. Nemesio Montano	EPAI-WWC	<ul style="list-style-type: none"> <li>• Chemistry</li> <li>• Biological Chemistry</li> </ul>	CMW ERA
33. Marcial Semira	PRC EMI	<ul style="list-style-type: none"> <li>• Waste Minimization</li> <li>• Environmental Audit</li> <li>• Energy Conservation</li> </ul>	PMA

Resource Person	Affiliation	Expertise	Workshop Involved
34. Efren Mariano	SKI	<ul style="list-style-type: none"> <li>• Chemical Engineering</li> <li>• Environmental Engineering</li> <li>• Business Administration</li> <li>• Environmental Planning</li> <li>• Wastewater treatment</li> <li>• Water supply system design</li> <li>• Project Management</li> </ul>	PMA
35. Valeriana Reyes	EPAI-WWC	<ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• Occupational Safety &amp; Health</li> <li>• Industrial hygiene and surveys</li> </ul>	ERA
36. Leticia dela Cruz	EPAI-WWC	<ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• EIA</li> <li>• Wastewater treatment</li> </ul>	EIA
37. Daphne O. Bate	EPAI-WWC	<ul style="list-style-type: none"> <li>• Internal &amp; pulmonary medicine</li> <li>• Investigative research on health hazards</li> </ul>	ERA
38. Raoul Cola	EPAI-WWC	<ul style="list-style-type: none"> <li>• EIA</li> <li>• Environmental Health</li> <li>• urban and rural sociology</li> <li>• Community resource development</li> </ul>	EIA
39. Enrique Pacardo	SKI	<ul style="list-style-type: none"> <li>• Environmental Planning and community-based resource management</li> <li>• EIA</li> <li>• Agroforestry</li> <li>• Farming systems</li> </ul>	EIA

ACRONYMS:

PMA	-	Pollution Management Appraisal
CM	-	Compliance Monitoring
CA	-	Compliance Audit
ERA	-	Environmental Risk Assessment
EIA	-	Environmental Impact Assessment
DCSSA	-	Data Collection, Sampling and Sample Analysis

## Appendix J IEMP Special Activities

Special Activity	Description
Industry-specific Seminars (4 completed)	One-day seminars to introduce concepts of waste minimization conducted upon request
Industry-specific PMA Workshops (4 completed)	Three-day workshops for Cement Manufacturers Association, Cotabato Hog and Cattle Raisers Association, Philippine Sugar Millers Association, and Batangas Bay Foundation
Non-industry PMA workshop (5 completed)	Three-day workshops for NGOs, LGUs, academe, professional associations and DENR
Train-the-Trainers Workshops (4 completed)	Three-day workshops for DENR, NGOs, and LGUs
Trainers Assessment of Proficiency Certification Course	One-day Course for DENR HRD staff
Interim Guidelines on the Importation of Recyclable Materials	Guidelines on importation, processing, and disposal of recyclable materials containing hazardous substances
Workshop on increasing sanctions and strengthening fines and penalties structure	DENR RTDs workshops to discuss and improve PAB Resolution 10-B
Environews Newsletter	Quarterly publication of the newsletter
Establishment of EMB Home-page	A home page developed for EMB with PSDN as the internet provider
Pollution Management Guidebook	9 Industry-specific guidebooks on waste minimization
Industrial Environmental Management Action Plan (1996 - 2000)	Five-year action plan on industrial environmental management for DENR
DENR Annual Environmental Recognition Awards	DENR awards given to industries in recognition of their initiatives on waste minimization given in 1994 to 1996
Workshops and Conferences on House Bill #4 (Philippine Environmental Code)	2 workshops conducted to assist DENR and House Committee on Ecology in drafting House Bill #4
Air and Water Quality Monitoring Manuals	2 manuals to help DENR regional office personnel implement compliance monitoring activities

## Appendix K

### IEMP Extension Activities

Extension Activities	Accomplishments
<b>1.0 Support to Implementation of Pollution Charge System (User Fee System)</b>	
Assist LLDA in preparing for User Fee System implementation	<ul style="list-style-type: none"> <li>- Developed an Industrial Effluent Guide for use of LLDA staff and affected industries in computing for amount of fees to be paid</li> <li>- Conducted 2 training programs: workshop on user fee modelling and workshop on compliance monitoring and data collection</li> <li>- Provided staff to LLDA to encode data from files of more than 1,000 industries to the database</li> <li>- Assist in developing an LLDA Memorandum Circular defining the System's implementing regulations.</li> </ul>
<b>2.0 Support to Strengthen EIS System Implementation</b>	
Assist in revision, implementation and information dissemination of DAO 96-37	<ul style="list-style-type: none"> <li>- Published in newspaper a broadsheet information about the new EIS regulations (DAO 96-37)</li> <li>- Printed 2,000 copies on DAO 96-37 poster</li> <li>- Printed 1,000 copies of "Our Stake in the Future", primer on DAO 96-37</li> <li>- Printed 500 copies of the manual</li> <li>- Conducted 3 1-day seminars from general audience in Manila, Cebu and Davao with a total of 430 attendees</li> <li>- Conducted 5 2-day training workshops covering different regions, with a total of 237 participants from DENR, PENRO/CENRO offices</li> </ul>
Follow-up Activities for DAO 11 (EIS Programmatic Compliance)	<ul style="list-style-type: none"> <li>- Completed ecoprofiling of PHIVIDEC Industrial Estate</li> <li>- Conducted 3 presentation seminars for DENR RTDs, PHIVIDEC officials, and general audience about the PHIVIDEC ecoprofile results</li> <li>- Revised the land sector and water sector guide of the ecoprofiling guidelines and added a new guide on developing sampling and analysis plan for EISPC implementation</li> </ul>
<b>3.0 Support to DENR's Information, Education and Communication program on environmental management</b>	
Extension of IEC coordinator at DENR Office of Environment and Programs Development and at Davao City Chamber of Commerce and Industry, Inc.	Both coordinators assisted the offices in major activities such as development of IEC materials for DENR and development of action program for DCCCII

Extension Activities	Accomplishments
<b>4.0 Support to DENR in Implementation of RA 6969</b>	
Assistance to EMB and DENR regional offices in implementing RA 6969	<ul style="list-style-type: none"> <li>- Draft plan was prepared for and submitted to DENR and EMB</li> <li>- Assisted DENR in evaluating waste generation submissions</li> <li>- Provided hands-on training to selected DENR regions in conducting inspections and using the hazardous waste database</li> <li>- Conducted a 4 -day follow-on workshop on monitoring and inspection</li> <li>- Conducted consultation seminar with industries on the 5 proposed Chemical Control Orders</li> <li>- Developed brochures about the priority chemicals</li> </ul>
<b>5.0 Support to DENR in institutionalization of PMA</b>	
Assistance to DENR in developing action plan for DENR to implement a program sustaining the PMA	<ul style="list-style-type: none"> <li>- Drafted a DAO providing guidelines on waste minimization and PMA programs of DENR</li> <li>- Drafted suggested indicators for DENR regional offices' Key Result Areas on waste minimization</li> <li>- Transferred PMA database to 3 regions (Regions 7, 10, and 11) and trained the staff in the database use and management, and in conducting follow-up monitoring</li> <li>- Completed determination of Pollution Load Factor (PLF) for 7 industry subsectors (see Section 4 for related discussion)</li> <li>- Developed a user-friendly database named "Pollution Reduction and Environmental Management Information System/Philippines" (PREMIS)</li> </ul>
<b>6.0 Provide Linkage on IBM and CRM</b>	
Undertake support activities for CRMP	<ul style="list-style-type: none"> <li>- Completed water quality assessment of Saranggani Bay and Hillutangan Channel in Olango, both CRMP learning sites</li> <li>- Conducted a 2-day seminar on waste management for LGUs from areas covered by the CRMP Bais Bay learning site</li> <li>- Conducted a rapid survey of pollution sources in Bais Bay learning site</li> </ul>

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## Appendix L

### Private Sector Attitudes and Perceptions

Awareness and Knowledge of Waste Minimizations (WM)	Waste Management Practices	Factors That Most Influence Adoption of Waste Minimization	Barriers to Waste Minimization	Opportunities for Waste Minimization
<ul style="list-style-type: none"> <li>▶ WM is a relatively new concept in the Philippines</li> <li>▶ Large firms better understand WM concept than SMEs</li> <li>▶ There is a general lack of knowledge of pollutants and hazardous substances and their effects on health in general and industry workers in particular</li> <li>▶ Water management is considered the most serious issue related to waste management</li> <li>▶ Private sector and government perceive a high degree of tension between economic growth and increasing production, and concern for pollution</li> <li>▶ Ambient standards are considered to be unrealistically high and have become a source of harassment of private business, especially from local politicians</li> </ul>	<ul style="list-style-type: none"> <li>▶ End-of-pipe solutions for meeting regulatory standards is the dominant technology in pollution prevention</li> <li>▶ Most wastewater treatment facilities (WWTF) are old, inefficient, and cannot meet regulatory standards</li> <li>▶ Larger companies are implementing pollution prevention solutions and PMAs play an important role in convincing firms to invest in pollution prevention</li> <li>▶ Firms typically act on environmental cleanup and respond to environmental issues and concerns when inspected or when issued a CDO</li> <li>▶ New technologies are generally more environmentally friendly</li> </ul>	<ul style="list-style-type: none"> <li>▶ Most owners and managers perceive negative consequences of pressure from public and NGOs</li> <li>▶ The most important factor for investing in pollution prevention strategies is economic</li> <li>▶ Regulatory enforcement affects investment decisions</li> <li>▶ Pollution prevention investments are not generally based on corporate "good will"</li> </ul>	<ul style="list-style-type: none"> <li>▶ Owners and managers say they are open to the concept of WM but their workers are reluctant to implement PMAs because they believe changes may affect the schedule of operations, productivity and cost-competitiveness</li> <li>▶ Some small firm owners think that the best use of labor is to increase production rather than attend to the "nitty gritty" details and cleanups generally required for implementing low- and no-cost pollution prevention measures</li> <li>▶ Some firms are unable to implement PMA recommendations without more technical assistance than is provided by IEMP such as (1) technical and economic evaluation of alternative solutions, and (2) concept design of the adopted solution(s)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Owners and managers generally (1) desire to improve their relationship with the community and establish a good public image, (2) believe that the conflict between economic growth and environmental pollution should be resolved through the introduction of the appropriate mix of incentives and deterrents, and (3) believe it will take more effective communication between government and industries to achieve goals of national waste minimization</li> <li>▶ Industry associations realize they can play a vital role in closing the gap between government and public concerns about industrial pollution and the interests of industries</li> <li>▶ NGOs are playing a stronger role in detecting pollution, reporting it, and sometimes taking legal action</li> </ul>

Awareness and Knowledge of Waste Minimizations (WM)	Waste Management Practices	Factors That Most Influence Adoption of Waste Minimization	Barriers to Waste Minimization	Opportunities for Waste Minimization
<ul style="list-style-type: none"> <li>▶ Pollution prevention and control is a cost burden and will reduce competitiveness</li> </ul>	<ul style="list-style-type: none"> <li>▶ In most cases managers respond to discharge complaints brought to the regulatory agency by members of a nearby community</li> <li>▶ Most large- and medium-sized firms have identified pollution control officers (PCO)</li> <li>▶ Most facilities do not systematically collect and keep baseline data on the cost and types of raw materials and chemicals that enter the facility; the amount and types of waste they generate during production processes; or the effluent and emission level discharged</li> <li>▶ Self-monitoring is not complete; some firms sample only end-of-pipe effluent, and there is generally no monitoring of waste generation to identify the source of waste</li> </ul>		<ul style="list-style-type: none"> <li>▶ SME owners are reluctant to take actions that may increase production cost or adversely affect production</li> <li>▶ DTI, BOI and trade associations have not assumed their responsibilities for resolving the perceived conflict between industrial production and environmental pollution</li> <li>▶ Limited DENR funding and staff for industrial pollution control cannot cope with growing demand for services and enforcement</li> <li>▶ Laboratory facilities outside of Metro Manila are inadequate;</li> <li>▶ DENR is perceived as a regulator, rather than a facilitator of industrial pollution control and prevention</li> </ul>	<ul style="list-style-type: none"> <li>▶ Cooperative and consensus-building mechanisms among concerned regional and local officials and the private and nongovernmental sector in industrial management is starting to emerge outside of Metro Manila (Cebu and Davao)</li> </ul>

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Awareness and Knowledge of Waste Minimizations (WM)	Waste Management Practices	Factors That Most Influence Adoption of Waste Minimization	Barriers to Waste Minimization	Opportunities for Waste Minimization
	<ul style="list-style-type: none"> <li>• Excessive water use increases high discharge volume that may over-tax existing lagoons and WWTFs</li> <li>• Some firms deliberately dilute waste streams to reduce concentrations in order to comply with standards</li> <li>• The majority of target IEMP facilities did not have a environmental policy statement or support waste minimization prior to the PMA</li> </ul>		<ul style="list-style-type: none"> <li>• The relatively low cost of municipal water or an abundant supply of deep well water encourages excessive use and increases waste volume</li> <li>• Environmental policy requirements are incompatible with economic and technological realities of most SMEs-adequate financial incentives do not exist</li> <li>• The majority of owners know they should and would like to construct improved WWTF, but say financial constraints prevent this</li> </ul>	