



WORLD ENVIRONMENT CENTER



# FINAL REPORT FOR THE LOCAL ACCIDENT MITIGATION AND PREVENTION (LAMP) PROGRAM IN INDONESIA

**SUBMITTED TO:**

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)  
OFFICE OF FOREIGN DISASTER ASSISTANCE (OFDA)

**SUBMITTED BY:**

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## Acronyms

APELL	Awareness and Preparedness for Emergencies at the Local Level
BAPEDAL	Environmental Impact Management Agency (Badan Pengendalian Dampak Lingkungan)
BAPPENAS	National Development Planning Board (Badan Perencanaan Pembangunan Nasional)
CAER	Community Awareness of Emergency Response
CAMEO	Computer Aided Management of Emergency Operations
CANUTEC	Canadian Transport Emergency Centre
CDC	Centers for Disease Control and Prevention
CEPPO	EPA Chemical Emergency Preparedness and Prevention Office
CMA	Chemical Manufacturers Association
DEPDAGRI	Department of the Interior (Departemen Dalam Negeri)
DEPNAKER	Department of Manpower (Departemen Tenaga Kerja)
DOP	Diocetyl Phthalate
DOT	Department of Transportation (U.S.)
EPA	Environmental Protection Agency (U.S.)
FEMA	Federal Emergency Management Association (U.S.)
GOI	Government of Indonesia
IEF	International Environment Forum
KLH	Office of the State Minister of Environment (Kantor Menteri Negara Lingkungan Hidup)
LAMP	Local Accident Mitigation and Prevention
LEPC	Local Emergency Planning Committee
LPG	Liquid Petroleum Gas
MIACC	Major Industrial Accidents Council of Canada
MSG	Monosodium Glutamate
NGO	Non-governmental Organization
NFPA	U.S. National Fire Protection Association
OFDA	Office of Foreign Disaster Assistance
PIN	Product Identification Number
PVC	Polyvinyl Chloride
REMPS	Regional Environmental Management Plans
TEEX	Texas Engineering Extension Service (Texas A & M University)
USAID	United States Agency for International Development
UN	United Nations
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
WEC	World Environment Center

## Foreword

This final report is submitted by World Environment Center (WEC) in accordance with its Cooperative Agreement AOT-2515-A-00-2125-00 with the United States Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA) for a Local Accident Mitigation and Prevention (LAMP) program in Indonesia. The LAMP Indonesia program operated from October, 1992 through January, 1997. Similar projects in India, Mexico, and Thailand were also conducted concurrently. Reports for each of the four projects have been or are being submitted to OFDA separately, as each program existed under unique circumstances and achieved goals particular to host country conditions.

This report reviews the activities conducted during the LAMP Indonesia program, summarizes the impact of the program, and discusses benefits that will be realized in years to come as the Indonesian stakeholders — government, industry, and community leaders — continue the process of improving industrial safety and accident prevention and minimizing the threats posed by man-made disaster. WEC and OFDA's common goal of replicating successful aspects of the program is also discussed as a key to ensuring sustainability and maximizing impact. In keeping with OFDA's Monitoring and Evaluation Manual, baseline indicators are used as benchmarks against which all progress is measured.

WEC wishes to acknowledge the support of USAID/OFDA for providing core funding for this project, and to especially thank Barry Heyman, Chief, Prevention, Mitigation and Preparedness division, for his insight and guidance during the four plus years that OFDA supported the LAMP program.

## Executive Summary

In October, 1992 the World Environment Center (WEC) initiated a cooperative agreement with the United States Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA). The cooperative agreement called for the establishment of a five year Local Accident Mitigation and Prevention (LAMP) program designed to mitigate man-made disasters and emergencies in high-risk industrial areas in India, Indonesia, Mexico, and Thailand. The goals of the LAMP program are based on OFDA's prevention, mitigation, and preparedness (PMP) mandate – to save lives and protect economic investments.

WEC designed the LAMP program to build on the United Nations Environment Programme's (UNEP) Awareness and Preparedness for Emergencies at the Local Level (APELL) process. In doing so the LAMP program borrows key principles of developing safety and awareness capacity from this proven system for increasing awareness and minimizing risks posed by industrial development. In conducting the LAMP program, WEC also relies on the expertise and experience of U.S. organizations such as the Environmental Protection Agency's (EPA) Office of Chemical Emergency Preparedness and Prevention (CEPP), the Centers for Disease Control and Prevention's (CDC) Division of Environmental Hazards and Health Effects, the Department of Transportation (DOT), and other private and public sector organizations located in the U.S. and abroad. The Chemical Manufacturers Association (CMA), the Major Industrial Accidents Council of Canada (MIACC), and Texas A & M University's Texas Engineering Extension Service (TEEX) are but a few of the other groups that have contributed to the LAMP program. The input of all these groups enabled WEC to deliver appropriate and applicable expertise as required at each LAMP site.

LAMP's objective is to reduce the incidence and impact of major industrial, hazardous materials transport, or other technological accidents and disasters in selected areas of the target countries. LAMP activities are designed to foster sustainable improvements in emergency response and planning within the context of local conditions such as financial resources, motivation to improve safety, infrastructure, and other myriad factors specific to each LAMP country. LAMP works within these conditions to achieve realistic goals and improve safety in the short-term while also paving the way for further improvements that will save lives in the long-term. In this way the LAMP program is intended to develop prototypes that lay the groundwork for further accident preparedness and mitigation efforts. In addition, the capacity building that occurs and the emergency response plans and infrastructure created by LAMP are also valuable in times of natural disaster.

In Indonesia, WEC achieved positive results during the five years of program operation. These achievements stand in great contrast to the baseline conditions and show promise that capabilities will continue to develop following the LAMP program. One can point to progress in raising the level of awareness at the two primary LAMP sites of Cilegon and

Gresik<sup>1</sup>. WEC also provided local emergency response teams with technical training in areas such as fire fighting, hazardous materials emergency response, Computer Aided Management of Emergency Operations (CAMEO™) systems, medical aspects of chemical emergency planning, and other aspects of emergency planning and management. In short, the LAMP program provided participants with training in a number of emergency planning and response areas where outside assistance was greatly needed.

At both LAMP sites, the technical training activities culminated in an advanced three-day workshop in Hazardous Materials Emergency Response. These programs enabled response teams to practice requisite skills and drill regimens that would serve as a foundation upon which future training and mock drill activities could be developed. By participating in such training activities, local groups gained technical knowledge and experience with training techniques so that they are now able to practice emergency response scenarios independent of WEC's support. Prior to the LAMP program, the local groups with whom WEC worked were not able to plan and rehearse an integrated emergency response scenario. Providing this level of training to participants of the LAMP program serves as a springboard from which local groups will continue to train, practice and otherwise develop emergency response capabilities.

The delivery of expert technical training across a broad spectrum of fields related to industrial emergency response is, in itself, a worthwhile accomplishment of the LAMP program. However, it is necessary to understand these achievements in the proper context of the local conditions. The outside assistance of non-governmental organizations (NGO's), their consultants, and expert trainers alone cannot significantly impact the state of emergency response preparedness in industrial areas of Indonesia without parity from local constituents. In that regard, much is required on the part of government and industry leaders in order to engage the APELL process and maximize the impact of the LAMP program. Within the local context of Cilegon and Gresik, WEC's work is even more significant because it came in the relative absence of prior work to develop emergency response planning or engage the APELL process.

Prior to the LAMP program emergency response teams lacked critical equipment used in chemical emergency response. In order to improve the situation, WEC took great strides to introduce emergency response personnel to many of the planning concepts and response techniques used in chemical emergency response. In this way, the LAMP program developed a sense of urgency among government and industry leaders to upgrade equipment and improve training for workers who would be called upon in an

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<sup>1</sup> Select APELL workshops were also conducted in Bandung, Lhokseumawe, and Tangerang. As explained in greater detail in the body of this report, however, these sites were not found to be suitable locations for long-term program intervention.

emergency<sup>2</sup>. Private companies in the U.S. and Indonesia were also solicited by WEC to loan or donate equipment for use in LAMP training activities. This approach provided WEC with equipment that could not have been purchased simply for use in a training session. In this way, and at relatively no cost, WEC was able to conduct technical training courses that raised the level of chemical emergency preparedness.

In the wake of the LAMP program, work remains to be done to continue the development of emergency response capabilities in Cilegon and Gresik. Emergency response training needs to continue, and additional equipment must be purchased if local teams hope to better prepare for the dangers posed by industry and build upon the progress made during the LAMP program.

During the four plus years of working closely with industry and government leaders, WEC benefited from the support and dedication of these key players who championed the LAMP causes of raising awareness and improving emergency response capabilities. Industry response groups are taking on greater and greater responsibility for integrating emergency response planning. Community members are better informed about the risks posed by local industry plants and their roles in case of an emergency.

The LAMP program also succeeded by developing an atmosphere of true cooperation between public and private sector groups. Disaster management planning now takes place with the combined input of industry and government, whereas previously, government and industry acted autonomously. Fundamental changes like this go a long way toward increasing overall capabilities for emergency response and planning in Indonesia. In short, the APELL process has been well established among community, government, and industry groups at both LAMP sites.

At the same time, more work is needed in order to continue to develop emergency response capabilities in Cilegon and Gresik. In the absence of outside assistance from WEC or other development assistance groups, it will be up to the local stakeholders to take the initiative and follow through on the training and planning procedures advocated by WEC through the LAMP program.

As the LAMP program draws to a close in Indonesia, there are strong indications that local groups will continue to improve safety and planning capabilities. Industry emergency response teams in Cilegon continue to develop local capacity for emergency planning and response. In August, 1996 a mock emergency drill was organized and conducted by the Zone I team utilizing emergency response units from five different plants of the Cilegon Industrial Estate. WEC expects the Zone I team to continue to develop and rehearse an increasingly complex array of emergency response scenarios for their drill activities. Their next emergency exercise is currently scheduled for December

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<sup>2</sup> Access to supplies such as level A protective clothing, PVC boots and gloves, self-contained breathing apparatus (SCBA), and gas detection monitors, was the exception, rather than the rule at both LAMP sites at the beginning of the program.

and will test an accident scenario that includes a public evacuation of nearby community members. Emergency response teams from zones 2, 3, and 4 are also planning to conduct mock emergency drills as a regular part of their training regimen. The rehearsal of more and more complex drill scenarios is an excellent way of improving local capabilities and proof that WEC's work has yielded important results in Cilegon.

Emergency response teams from the Gresik industrial complex remain in contact with the Cilegon leaders and are thus tracking the progress made at the more advanced LAMP site. Gresik also shows promise for moving toward greater effectiveness and self-sustainability with regard to accident prevention and emergency response. In the remaining months of the LAMP program, WEC will continue to monitor local initiatives and facilitate the progress that is being made to ensure that local leaders understand the benefit of continually planning for emergency situations. By maintaining contact with the Cilegon industry leaders, Gresik shows promise to follow Cilegon's example and develop emergency response capabilities in keeping with the LAMP program and the APELL process.

Finally, there are signs on the national level that regulatory changes will soon be enacted to build on the work done during the LAMP program and provide greater impetus for improved safety and planning. The Environmental Impact Management Agency (BAPEDAL) is currently drafting regulations that will mandate the establishment of emergency planning groups at all high-risk industrial sites throughout Indonesia. When these new regulations come into play, Cilegon and Gresik will be better prepared to comply with the new laws than will other industrial areas in Indonesia.

Thus, progress towards improved industrial safety and crisis management is being made on the national as well as the local level and will likely continue following the LAMP program. The changes seen during the LAMP program are sustainable at each site and will continue to positively affect industrial safety and emergency response procedures in Indonesia. WEC is pleased with the progress made during the LAMP program and looks forward to facilitating similar capacity building initiatives in Indonesia in the future. Although Cilegon and Gresik lack the infrastructure and financial resources needed to develop modern emergency response systems, they have benefited a great deal from the LAMP program and will continue making progress at a respectable and steady pace. Participants in the LAMP program have gained practical knowledge and hands-on experience which are in great need at industrial facilities throughout Indonesia.

## I. INTRODUCTION

This final report is submitted to the United States Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA) in accordance with World Environment Center's (WEC) Cooperative Agreement for the Local Accident Mitigation and Prevention (LAMP) program for Indonesia. WEC conducted the LAMP program from its regional offices in Jakarta, with leadership and backstop support from its Washington, D.C. office. The program began in October, 1992 and concluded operation in January, 1997.

The objective of the LAMP Indonesia program was to reduce the incidence and impact of major industrial, hazardous materials incidents in and around chosen industrial areas. This report discusses the accomplishments of the LAMP program at two primary sites in Indonesia — Cilegon and Gresik — and also discusses separate activities that were conducted in other locations.

The report is written to provide OFDA and other interested readers with an indication of the overall impact achieved during the five years that the LAMP program was in operation. The body of the report includes the following sections:

Section II, **Implementation Approach and Site Selection**, discusses WEC's philosophy in implementing the LAMP program, and describes WEC's experience in identifying suitable sites in Indonesia.

Section III, **Baseline Indicators**, discusses the local conditions in Indonesia prior to the beginning of the LAMP program in October, 1992. This section also discusses the baseline abilities of local and national agencies to respond to technological accidents and other inherent risks associated with rapid industrial development.

Section IV, **Activities**, summarizes the major initiatives conducted during the LAMP program.

Section V, **Impact, Sustainability and Replication**, discusses the overall significance of the LAMP program at the LAMP sites and to Indonesia as a whole.

Section VI, **Lessons Learned**, comments on the process of conducting the LAMP program in Indonesia as well as WEC's perspective regarding efforts to conduct similar programs elsewhere.

Appendices follow the body of the report.

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## II. IMPLEMENTATION APPROACH AND SITE SELECTION

World Environment Center's (WEC) philosophy regarding the LAMP program hinges upon three central components which contribute to the overall direction of the program and the goals that it intends to achieve.

First, the LAMP program builds on the United Nations Environment Programme's (UNEP) Awareness and Preparedness for Emergencies at the Local Level (APELL) process as a model for systematically increasing awareness and developing emergency management capabilities. The basic components of the ten step APELL process are illustrated in Figure 1. LAMP was designed to build upon the APELL process by bringing additional resources to bear and by working intensively with select industrial areas over a period of several years. In this way, the LAMP program continues the APELL process and enables participating industry centers to improve planning and response capabilities at a greater rate than they otherwise could without such sustained support.

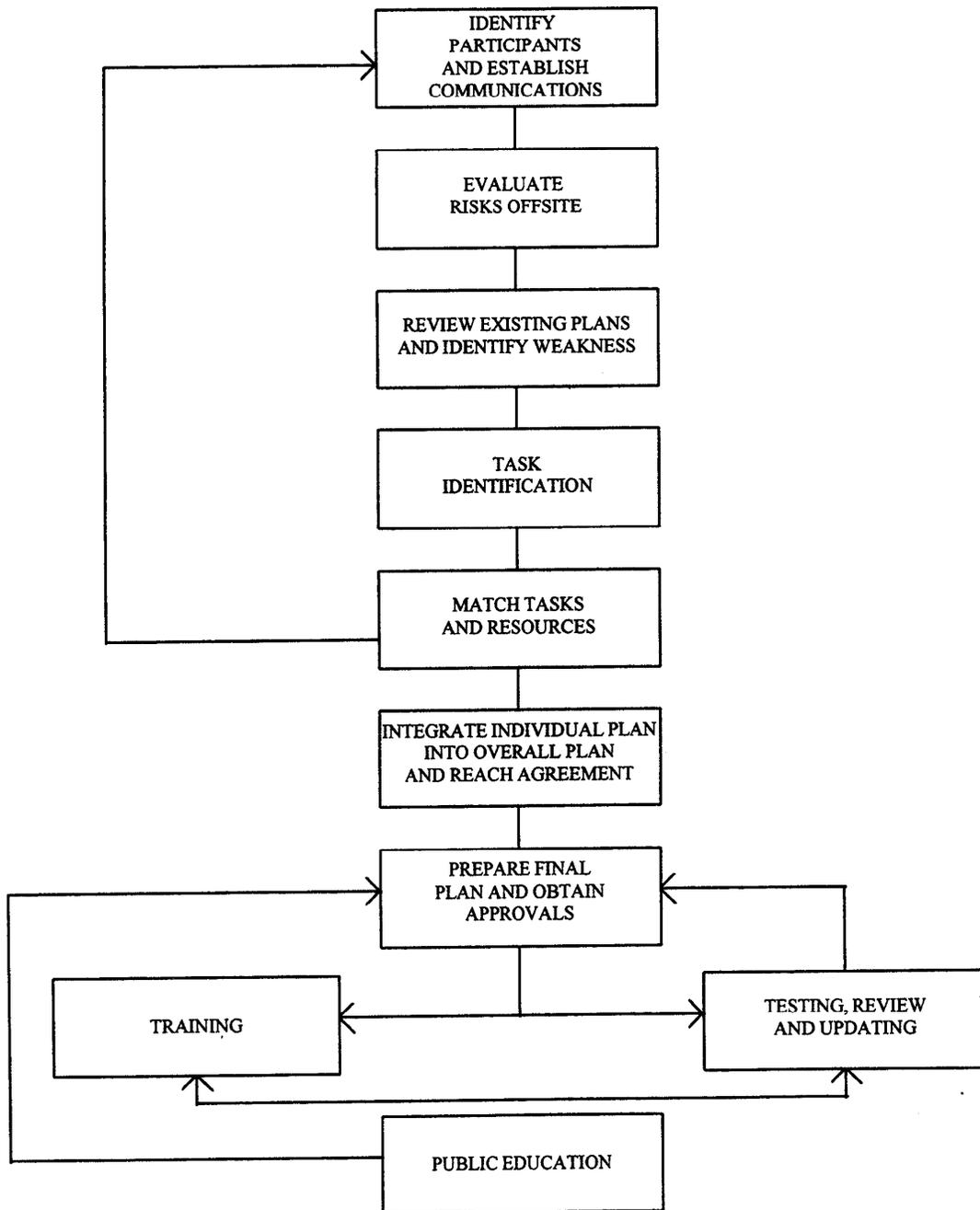
In Indonesia WEC initiated and participated in numerous educational activities, training sessions and planning meetings that fall within the framework of the APELL process. The major activities are summarized in Section IV, and the full list of activities are outlined in Appendix A. The following list, however, gives an indication of the broad range of issues addressed in Indonesia through the LAMP program:

- Risk assessments of plants and industrial complexes;
- Chemical emergency preparedness and accident prevention (CEPAP) training;
- Information management seminars, including the use of Computer Aided Management of Emergency Operations (CAMEO™) technology;
- First responder training in industrial fire safety and hazardous materials incidents;
- Medical response workshops and training for doctors, nurses, and paramedics;
- Hospital capability assessments;
- Risk communication and community outreach and education workshops; and
- Other appropriate activities suiting the needs of at-risk communities.

Apart from the benefit of conducting such activities, LAMP builds upon the APELL process by relying on the direct involvement of accomplished industrial leaders from the countries where the program operates. This high-level involvement is the second key component of the LAMP program. In Indonesia WEC relied upon the combined efforts of WEC Country Director, Mr. Harry Wiradiputra and LAMP Country Manager, Mr. Oedojo Oesman, both of whom worked closely with local, regional, and national leaders from the private and public sectors in order to bring focus and direction to LAMP activities. The success of any LAMP program hinges upon the ability of WEC to apply the APELL process to local conditions and identify suitable partners with whom WEC can effectively work. Mr. Oesman, Mechanical Engineer with several years experience

# Community Emergency Plan Implementation Flow Chart

Figure 1.



with one of the largest fertilizer industries in Indonesia, P.T. Pupuk Sriwijaya (PUSRI), and 15 years of background as Safety & Hygiene Auditor for Goodyear Subsidiaries in Asia Region, directed LAMP activities for the first two years of the program and was very effective at facilitating the LAMP process.

Mr. Oesman left WEC in June, 1994, at which time Mr. Harry Wiradiputra assumed responsibility for the LAMP program as one of the duties as WEC Country Director. Mr. Wiradiputra, a board member of Goodyear/Indonesia, is also a distinguished military veteran who ended his career with the rank of Colonel. His industry background and experience with the Indonesian military provided Mr. Wiradiputra with a wealth of contacts that were useful in implementing LAMP activities. He also performed the important task of translating at many LAMP activities where local participants and international experts did not speak the same language. Without his leadership and direction, WEC could not have accomplished as much as it did during the LAMP program.

The third central component of the LAMP program involves site selection. Since LAMP is designed to develop model industrial planning and response systems, site selection is critical to the overall success of the program. The basic criteria for a LAMP site requires that:

- Sites are found in an industrial zone where flammable, explosive or acutely toxic substances are produced or utilized in local production processes or transported through the community;
- A significant number of persons reside near the industrial zone and are, therefore, at risk;
- Effective disaster response capabilities exist or can be created;
- There is an expressed local concern and an interest in organizing an effective accident prevention, mitigation and preparedness program;
- Private as well as public industry leaders are committed to collaborative actions and can leverage other local institutions;
- LAMP exercises are likely to promote successful, collaborative actions by private and public groups; and
- There is potential to replicate activities from LAMP sites to other industrial areas of the host country.

WEC typically relies on a bottom-up approach using facility tours and investigative meetings with local level leaders to determine appropriate LAMP sites. The selection of sites is done jointly with local and national officials in each country. The main national agency in Indonesia is the Environmental Impact Management Agency (BAPEDAL), which had been in contact with the United Nations Environment Programme (UNEP) prior to the LAMP program. After some discussions with local officials and BAPEDAL, Cilegon Industrial Complex and Gresik Industrial Complex were selected as the two

primary sites. Prior to that, BAPEDAL asked UNEP to conduct one APELL workshop in Lhokseumawe in North Sumatra.

Background descriptions for both Cilegon and Gresik are given below, along with information concerning Lhokseumawe and two other sites where LAMP activities were conducted on a limited and/or experimental basis.

### Primary LAMP Sites

#### **Cilegon Industrial Complex**

The Cilegon Industrial Area, located in the Serang Regency on the northwest tip of Java, is a major petrochemical development for import and export of natural gas and other liquid petroleum gases which are piped in from the Java Sea. It is located approximately 120 km from Jakarta.

There are approximately 39 large chemical plants in the industrial complex, with Krakatau Steel, a large steel producer and gas handling company, situated in the center of the complex. Krakatau Steel has the largest operation in the Cilegon complex, and is also involved in most of the LAMP activities conducted in Cilegon. Other multinational companies, such as Hoechst Celanese, Arco, and Dow also have operations in Cilegon. Many of the individual facilities are modern and equipped with adequate emergency response equipment, however, infrastructure in the region as a whole has yet to be developed adequately to take into account the possibility that a large scale accident could occur. Roads, which are used to transport hazardous materials produced and used in Cilegon, are undersized and overcrowded. Also, there is currently no secondary road which could be used in the event of a major catastrophe. At the onset of the LAMP program, this basic lack of infrastructure and planning was seen as a primary indication of substandard safety conditions in Cilegon.

#### **Gresik Industrial Complex**

Gresik is the oldest petrochemical industrial complex in Indonesia. Approximately 20 chemical-related medium and large scale industries operate in the coastal region of Gresik. Approximately 850,000 people reside in the Gresik Regency, most of whom live in or near the capital city, Surabaya.

### Secondary LAMP Sites

#### **Lhokseumawe**

Lhokseumawe was identified by BAPEDAL as a primary site for the LAMP program during the planning stage of the program. At BAPEDAL's invitation, WEC conducted an APELL workshop in Lhokseumawe in November, 1993. In conducting the APELL seminar it became clear that Lhokseumawe did not fully meet the criteria for LAMP sites.

Lhokseumawe is located on a relatively remote island with a low population on the North tip of Sumatra. Thus, the risks posed by industry to life and property do not conform to LAMP program requirements. In other words, there is limited community at-risk with which the LAMP program could focus activities. Furthermore, the industrial facilities located on that part of the island already possess excellent emergency response and planning capabilities and would likely not benefit further from the LAMP program. In the case of Mobil Oil's operation, the entire facility is state-of-the-art and was developed with great attention to prevention and mitigation issues. Other companies on the island are also well trained and well equipped to respond to accidents.

Following the APELL workshop, BAPEDAL and WEC agreed that Lhokseumawe was not a suitable candidate for the LAMP program and that activities should be concentrated in Cilegon and Gresik for the remainder of the LAMP program.

### **Bandung**

At the special request of the Governor of the West Java Province, WEC organized and lead an APELL workshop in Bandung in April, 1994. Since WEC was planning to focus LAMP activities in Cilegon, the West Java government leaders preferred that all of the 18 regions have at least some exposure to the LAMP program and the APELL process. Had it not been for the political dynamics involved, WEC would not have conducted this activity.

Bandung is the capital city of West Java Province, which contains a total of 18 regencies. West Java leads the nation in industrial growth and contains the majority of newly established industrial estates. The APELL workshop was attended by government representatives from nearly all 18 regencies in West Java along with numerous local Bandung officials and industry representatives. Following this workshop WEC did not actively pursue the involvement of regencies other than Serang, where the Cilegon industrial complex is located.

### **Tangerang**

Tangerang is located between Cilegon and Jakarta and includes numerous medium scale industries which produce or use hazardous materials. The industrial make-up of Tangerang, combined with the fact that the complex is located near Cilegon, seemed to present WEC with an opportunity to maximize the use of LAMP resources and conduct activities in Tangerang in conjunction with activities scheduled for Cilegon. Thus, following the APELL workshop in Bandung in April, 1994, the Mayor of Tangerang asked WEC to include Tangerang as part of the LAMP program.

In response to this initial request, WEC sent a group of consultants from the United Nations Environment Programme (UNEP) and Texas Engineering Extension Service (TEEX) to make presentations in Tangerang as a follow-up to topics discussed earlier at the Bandung workshop. Although the workshop in Tangerang was a success, it was also

recognized that there were many differences between the size and types of industry present in Tangerang in contrast to those that WEC was working with in Cilegon. Therefore, following the November, 1994 workshop it was agreed that WEC should not incorporate Tangerang into the activities being developed for Cilegon, but could return to Tangerang at a later date if and when funding allowed for activities to be developed specifically for Tangerang.

The remainder of this report deals primarily with the activities conducted and results achieved at the two primary LAMP sites of Cilegon and Gresik. The determination of the LAMP program's success at these sites is based on the changes seen during the life of the program in contrast to the baseline conditions found when the program began. The next section of this report discusses the baseline indicators that relate to the LAMP program in Indonesia.

### III. BASELINE INDICATORS

The LAMP Indonesia baseline indicators used to monitor program performance and impact were derived from three sources. First, World Environment Center (WEC) developed a set of criteria based on initial observations of industrial areas and discussions with Government of Indonesia (GOI) officials during the design phase of the LAMP program. These conditions were used throughout the LAMP program as monitoring and evaluation benchmarks for reporting to the Office of Foreign Disaster Assistance (OFDA). Additional information concerning levels of preparedness and abilities to respond to industrial accidents was also gathered throughout the five year period that the LAMP program operated. Finally, this section includes information obtained from WEC's Country Profile for Indonesia, a document that was published in 1992, the same year that the LAMP program began. In 1992, the following criteria were observed:

- **Emergency Planning Groups: Industry mutual aid groups were loosely formed prior to the LAMP program.** Mutual aid groups (called BILIKs) were organized prior to LAMP. They had not, however, actively engaged local groups concerned with disaster prevention and mitigation, nor had they effectively developed integrated plans for emergency response.
- **Community Participation/Awareness: Disaster planning did not involve community members or elected officials prior to the LAMP program.** Disaster planning prior to LAMP involved mostly industry representatives, and did not include or attempt to raise awareness on the part of the general population. No disaster planning exercises involving community members had been conducted in either of the primary LAMP sites.
- **Response Capabilities: Relatively few large, mainly multinational firms had prepared emergency contingency plans.** Capabilities for the integration of on-site and off-site emergency response were insignificant when compared to the risks posed for industrial accidents. Discussion of integrated response and mutual aid prior to 1992 mainly concerned planning for natural disasters.
- **Emergency Response Equipment: The presence of emergency response equipment was inconsistent between industries and particularly inadequate where it concerned local government.** Many basic supplies and equipment needed for emergency response was not available. Gas detection monitors, self-contained breathing apparatus (SCBA), chemical spill/leak clean-up kits, and protective clothing was not available at many industrial facilities. Whereas a shortage of equipment was the rule, a few larger and usually multinational companies did possess adequate emergency response equipment.

- **Transportation Safety: Transportation infrastructure has yet to be developed in a sufficient manner to allow for the possibility of large scale chemical emergencies.** Although industrial development at many LAMP sites is modern, road access has yet to be developed in a sufficient manner to allow for the safe access of trucks carrying hazardous materials. Making the situation more dangerous, very few hazardous materials carriers use placard identification, nor does Indonesian law require carriers to do so. In Cilegon, these shortcomings are particularly problematic due to the confined coastal strip where the complex is located. In the event of a large-scale accident, transportation routes could aggravate an already dangerous situation.
- **Medical Preparedness: Emergency medical capabilities were insufficient or simply non-existent prior to the onset of the LAMP program.** Sources of information on toxic chemicals are virtually nonexistent for physicians and public health authorities throughout Indonesia. No poison or chemical emergency information center exists in Indonesia. Many hospitals surveyed during the LAMP program did have written disaster plans for natural disasters, however, none had specific procedures for response to chemical or industrial accidents. None of the hospitals visited by WEC had proper ventilation for decontamination of hazardous materials victims<sup>1</sup>.
- **WEC's 1992 Indonesia Country Profile mentions a number of areas where environmental laws and enforcement practices fall short of the risks posed by industrial development:** "Hazardous waste regulations (regulated by the Department of Industry since 1985) are vague and have never been effectively enforced... Workplace health and safety does not appear to be a major government priority... Formal emergency planning requirements are not specifically codified, except for nuclear facilities... BAPEDAL plans to establish a system of site inspection to supplant the current (1992) mode of self-inspection... Environmental regulation is currently in a process of transition in Indonesia<sup>2</sup>."
- **General Assessment: The status of emergency management planning and disaster preparedness at LAMP sites was under-developed in contrast to the risks posed by industry.** Although much remains to be done in order to effectively improve emergency response capabilities in Indonesia, there are signs that progress is being made. In 1995, for example, BAPEDAL began work on a "National Contingency Plan for Emergency Response." Prior to 1995, there was no such comprehensive plan for large scale disasters, natural or man-made. The development of a national planning strategy is the first step in a long process of emergency management and industrial risk minimization.

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<sup>1</sup> Appendix B contains more information concerning medical preparedness at sites visited during the LAMP program.

<sup>2</sup> WEC - Indonesia Country Profile, prepared for WEC by Warner-Lambert Company, March, 1992.

#### IV. ACTIVITIES

This section describes the major initiatives conducted in Indonesia under the LAMP program. The activities described below constitute the major initiatives — workshops, trainings, consultant visits, drill activities, etc. — conducted during the program.

##### **Activity 1 - October, 1993**

##### **Chemical emergency preparedness experts assess sites and conduct APELL seminars**

The first LAMP activity conducted in Indonesia consisted of two related activities which served as a foundation upon which future activities could follow. First, experts from the Environmental Protection Agency's (EPA) Chemical Emergency Preparedness and Prevention Office (CEPPO), along with experts from the United Nations Environment Programme (UNEP) presented an introductory seminar on the Awareness and Preparedness for Emergencies at the Local Level (APELL) process in Lhokseumawe.

Following the APELL workshop, World Environment Center (WEC) and EPA/CEPPO conducted facility tours in Cilegon and discussed chemical emergency response and preparedness procedures with local industry and government officials. Both activities were successful starting points for the LAMP program in Indonesia in that they provided local participants with essential information about how to assess and improve chemical emergency preparedness in industrial areas. It also provided WEC with first hand information on the level of planning and preparedness at specific industrial sites.

The Lhokseumawe APELL workshop was designed to introduce participants to the fundamental aspects of disaster planning and community participation in the planning process. Mr. Charles Gazda, EPA/CEPPO, discussed the role of the national government and advised local stakeholders as to how they could develop disaster plans to take advantage of existing federal mechanisms. He also discussed the federal role in legislation, existing laws, and areas where more could be done to regulate and legislate improvements in safety and disaster planning. The need for a national disaster contingency plan was also discussed, and it was noted that John Mehok and Joe Kwan of Mobil Oil were currently working on a "National Contingency Plan" for Indonesia<sup>3</sup>.

Mr. John Ferris, EPA/CEPPO, discussed the roles that community members can and should play, and also stressed the need for a communities "right to know." Although the SARA Title III "Right to Know" act is a U.S. mandate and not enforced by law in Indonesia, participants in Lhokseumawe readily agreed that more should be done to educate and involve community members. Mr. Ferris also gave an overview of Computer

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<sup>3</sup> As noted above, BAPEDAL also began working on a National Contingency Plan for Emergency Response in 1995.

Aided Management of Emergency Operations (CAMEO™) and its applicable use in disaster management planning.

The APELL workshop was attended by the Environmental Impact Management Agency (BAPEDAL) representatives, local industry leaders, local community leaders, and elected officials. The workshop successfully introduced participants to many disaster planning issues and helped them see the need for coordination among planning groups, and the integration of emergency procedures to include local government, industry, and community as well as national input required by the planning process.

Following the workshop, BAPEDAL issued a report summarizing the major areas where work could be done to improve emergency response planning and integrate the various groups responsible. First, in order to develop coordination among otherwise disparate groups (i.e. industry, government, and community), BAPEDAL echoed workshop comments by citing the need for emergency response training exercises which involve all groups. Second, the report called upon national agencies to develop clear and strong legislation regarding response to emergencies resulting from industrial activity; and to better define the duties, obligations and responsibilities of each relevant government institution as well as the rights, obligations and responsibilities of industry and community. The report also calls for the amendment of Lhokseumawe's North Aceh government decree 310/13/SK/1993 concerning the establishment of Emergency Response Assistance Teams (Tim Bantuan Penanggulangan Keadaan Darurat) to identify and employ a communication system that effectively links government, community, and industry. Finally, the BAPEDAL report is important in that it points out the need to define and begin working towards a long-term disaster management strategy in Lhokseumawe that puts into effect many of the concepts discussed during the APELL workshop.

Following the APELL conference, WEC and EPA visited a number of industrial sites in Cilegon to witness local emergency planning and discuss future planning needs with concerned leaders from industry and government. As part of this facility tour, PT. Polychem, PT. Krakatau Steel, and PT. Asahimas were each visited, with a safety and planning presentation being made at the beginning of each visit. The major findings of each facility tour follows.

#### PT. Polychem:

The plant was opened in 1984. Its main product is polystyrene. Until 1992 they received their raw material (styrene monomer) by ship. They now get their raw material from an adjacent facility, Styrimdo Mono Indonesia which began operation in 1992. The plant employs 117 people and has one medical doctor, Dr. Hardi. Dr. Hardi spends several hours per day caring for the public (approximately 100,000 people live in the area) as well as attending to his duties at the plant. Dr. Hardi has a list of some chemicals used by

the plants in the area. Plant personnel have monthly safety exercises and are equipped with walkie-talkies to communicate.

Representatives from PT. Polychem meet with representatives of the seven other industries in the area on a monthly basis to discuss various issues and on a quarterly basis with the local Chemical Manufacturers Association (CMA) from the Cilegon area. These quarterly meetings are periodically attended by mayors and police chiefs from these areas.

While there are no formal mutual aid agreements between these plants, mutual aid issues have been discussed and are recorded in the meeting minutes. Due to the general lack of emergency response equipment in Cilegon, industry mutual aid agreements were strongly encouraged by WEC so as to promote the use of and access to scarce emergency response resources.

It was noted that there are no standard placards on trucks identifying hazardous materials cargo. As this area continues to expand with new petrochemical plants, there becomes a growing need to develop a national standardized placarding system for all trucks transporting hazardous materials.

#### PT. Krakatau Steel:

The Krakatau Steel plant in Cilegon is the largest integrated steel plant in Indonesia. The plant was started in 1971 and presently produces 1.5 million tons/year, and will increase capacity to 2.5 million tons/year by 1994. They have internal programs in industrial safety, environmental controls, health, and hygiene, and feel that within their plant they have very good environmental programs. Krakatau representatives also expressed concern over neighboring industry where such programs may be inadequate.

#### PT. Asahimas Subentra Chemicals:

The PT. Asahimas plant began operation in 1989 and produces caustic soda (134,000 tons/year), sodium hypochlorite (25,000 tons/year), HCL (42,000 tons/year), liquid chlorine (12,000 tons/year), and Polyvinyl Chloride (PVC) (140, 000 tons/year). They feel the government may need to restrict and/or control civilian growth in the area because of the increase in the petrochemical industry development in the area. Each company in the area is at a different level with regard to training and equipment, they pointed out. As an example, there is only one fire engine in certain areas of Cilegon, whereas Krakatau Steel alone has over 20 trucks. They also expressed concern for problems such as non-uniform couplings between the various plants. They have prepared a contingency plan but have no command center and they have not yet conducted any drill exercises. They do have chlorine/VCM detectors. Trucks hauling liquid chlorine have patrol car escorts. They also pointed out that these trucks have no uniform placarding to identify hazardous materials.

The overall findings of these facility tours indicated the need to consider the Cilegon/Anyer/Merak area as a high priority for LAMP/APELL activities. There is a high concentration of industry with a large civilian population nearby. There is a potential for accidental releases of hazardous materials from both transportation and fixed facilities. Industry in these areas meet on a regular basis to discuss safety issues, however, much more can and should be done to promote concrete improvements in safety and disaster preparedness. The development of contingency plans, mutual aid agreements, infrastructure, training, and establishing a communication strategy with the surrounding civilian population are safety priorities for the industrial estate.

The linkage between worker safety and accident prevention was discussed at all of the meetings and could serve as a starting point for taking the above mentioned steps. Unsafe practices (e.g. persons welding without the use of eye shields) were observed at all plants, and safety equipment, although better at Krakatau Steel than at other sites, was uniformly inadequate by Western standards. Therefore, accident prevention should be included with future discussions of worker safety. The concept of "safety first" must be known and understood by all plant personnel in order for accident prevention and preparedness programs to work.

These visits provided WEC with greater perspective on local conditions in Cilegon and served as a foundation upon which future LAMP activities were developed. Both WEC and the Indonesian participants learned from the meetings held and information shared.

### **Outcome**

Following this workshop, BAPEDAL issued a report summarizing the major areas where work could be done to improve emergency response planning and integrate the various groups responsible.

Mutual aid was one of the areas cited in the report as essential to building local emergency response capabilities. Prior to the LAMP program, there were no mutual aid agreements between plants in Cilegon. Due to the general lack of emergency response equipment, industry mutual aid agreements were strongly encouraged by WEC to promote the use of and access to scarce emergency response resources. This kind of advocacy by WEC represents a starting point from which significant mutual aid planning took place in Cilegon, and which culminated in the performance of the first complex mock emergency drill, as discussed below in Activity 14.

It was noted by WEC experts that, in future discussions, accident prevention should be included as part of discussions on worker safety. The concept of "safety first" was not well understood by plant workers at this time, and must be better understood in order for accident prevention and preparedness programs to have impact. This observation indicates the relatively modest level of awareness present at the onset of the LAMP program.

## **Activity 2 - March, 1994**

### **Medical emergency response seminars and hospital preparedness assessments**

At WEC's request Dr. Eric K. Noji of the Centers for Disease Control and Prevention (CDC) visited Cilegon and Jakarta to lecture on the medical aspects of chemical emergency response and evaluate existing on-site and off-site facilities for medical response to chemical emergencies. The lectures presented by Dr. Noji covered the following topics:

- Introduction to disaster medicine;
- Case studies in chemical and industrial disaster: Bhopal, Klong Toey and Guadalajara;
- Hazard and vulnerability assessment;
- Health sector planning for industrial disasters;
- Rapid assessment of medical and public health needs following industrial disasters; and
- Medical management of chemically contaminated patients.

Dr. Noji also visited the following facilities in Jakarta and Cilegon:

- Cipto Mangunkusumo Public Hospital, Jakarta ;
- RS FK Universitas Kristen of Indonesia, Jakarta (a private hospital);
- PT. Krakatau Steel Hospital; and
- Serang Public Hospital

The facility tours conducted by Dr. Noji provided participating hospitals with an opportunity to review their existing capabilities and planning procedures. The objectives of the facility tours were as follows :

- To document and discuss chemical risks that could occur, the medical impacts on persons working on or near the facilities, and to give recommendations of actions to prevent, mitigate and respond to such potential emergencies; and
- To evaluate existing on-site and off-site plans for medical response to chemical emergencies.

At the conclusion of each hospital survey, special attention was given to providing suggestions to hospital staff for improving off-site emergency plans (e.g., documentation of chemical risks for morbidity and mortality, scenarios of likely disasters and important actions to be taken to respond to each scenario) and the relationship of those plans to the local public health community and other relevant emergency response sectors: primary treatment centers, local health departments, police, fire services, Red Cross, civil defense, industrial and occupational health community, etc.

The development of such plans is seen as an essential step necessary to improve emergency medical capabilities at LAMP sites. Currently, however, few health facilities

are able to adequately handle serious chemical injuries and other acute exposure emergencies. Furthermore, many doctors receive no special training in toxicology and the treatment of chemical exposure victims. The doctors surveyed by Dr. Noji had little or no knowledge of chemicals produced and used in their areas. In short, hospitals surveyed in Jakarta and Cilegon are not adequately prepared for chemical or other industrial accidents. On a more positive note, Dr. Noji observed that the regional hospital for Cilegon (Serang Public Hospital) is developing plans to become a local resource center for treating people injured in industrial accidents. They are building a new three story emergency unit in anticipation of treating more occupational accident victims as Cilegon continues to grow.

Dr. Noji's contact with medical professionals also allowed him to observe the state of health care in Indonesia. Although not directly relevant to the scope of work for this LAMP activity, these findings deserve mention because they present the context in which any attempt to improve emergency medical care must be considered. Therefore, a summary of Dr. Noji's observations on the Indonesian health care system follows (Appendix B contains Dr. Noji's recommendations related to medical preparedness for chemical or industrial disasters):

- As of 1987, Indonesia had only 734 general hospitals with 88,413 beds. This is considered low for a nation with a population of 180 million.

- First aid by the lay population (i.e. paramedics) is almost non-existent in Indonesia and patients are usually transported to hospitals by any means available. Pre-hospital emergency medical services, however, have been developed by a few municipal governments as well as some semi-private organizations. Ambulances, where they do operate, are typically used for transportation between hospitals with little or no medical treatment rendered to the patient while in transit.

- The largest hospital in the country (Cipto M Hospital, Jakarta) — a modern, well-equipped, and internationally funded hospital — does not employ anyone with poisoning or toxicological expertise and has very few burn patient beds.

- Indonesia has implemented an emergency "118 Ambulance Service" similar to the U.S. "911" protocol, however, the service achieves limited success due to the fact that many people do not have telephones in their homes. Also, there is little or no coordination between the 118 Ambulance Service and other response groups. In Jakarta alone, five 118 Ambulances are equipped to form a field hospital capable of triaging and treating up to 100 casualties at one time.

Dr. Noji also recommended the following steps that must be taken in Cilegon, or at the local level of any LAMP site, in order to begin developing medical emergency capabilities:

1. Develop an inventory of chemicals and the conditions of manufacture. Information-collecting activities need to be pursued to evaluate the distribution of chemical accidents and transportation releases, the types of chemicals involved, the nature of acute morbidity

and mortality associated with such releases, the population groups most affected, etc. Such data should include information on the chemicals most often involved in accidental releases, the likely cause of the accident, the sources of in-transit releases, and the chemicals most often associated with deaths and injuries<sup>4</sup>.

2. Simulated disaster exercises should be developed in accordance with the chemical information gathered to test the quality of disaster plans.
3. A local emergency planning committee should be established.
4. Conduct "train-the-trainer" workshops for chemical and industrial disaster preparedness and response in order to increase chemical and industrial accident awareness.
5. Develop a chemical accident or incident registry, so that lessons learned will not be forgotten or lost<sup>5</sup>.
6. Implement periodic chemical disaster preparedness drills. A full-scale "rehearsal" for chemical or industrial disasters should be conducted that involves multiple sectors including the health sector.
7. Specific antidotes (based on an inventory of common chemicals used in local industries) plus medications for symptomatic treatment should be stored in sufficient quantity to meet all contingencies in hospitals which potentially would care for chemically contaminated workers.
8. More physicians in Indonesia need to be trained in industrial hygiene, industrial medicine, and occupational and environmental health.

In conclusion, improving industrial accident mitigation requires the evaluation of hazards and risks at the local level in Indonesia. Evaluation of risk should include a national database about public and occupational health and environmental exposures. The primary purpose of collecting this information is to track chemicals with the greatest inherent toxic potential and identify situations in Indonesia where accidents occur. A simple accident reporting system developed by environmental, occupational or public health authorities may help identify potential sources of future accidents and provide some indications of appropriate actions to be taken for prevention and actual response to industrial disasters.

### **Outcome**

Dr. Noji's visit was useful in that it provided information on medical preparedness for chemical emergencies to a wide range of medical professionals in great need of training.

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<sup>4</sup> WEC has promoted this recommendation via industry groups in Cilegon. Although safety managers agree verbally with the need to collect information, the response to written requests has been disappointing. Citing the need to maintain the confidentiality of "trade secrets," many companies refuse to go on record with the chemicals used at their facilities.

<sup>5</sup> With regard to this proposal, local industry representatives frequently take the position that there are no accidents, and never have been. Thus, the argument goes, there is no need to adopt a policy of documenting them. A large scale accident would be impossible to cover up, however, small "unexplained" airborne odors and off-shore spills are common at industrial facilities. To date, they go undocumented.

His recommendations provided doctors and hospital administrators with a practical list of steps to improve their chemical emergency preparedness.

Dr. Noji's observations also point out the medical emergency baseline from which the LAMP program began working. Simply put, the emergency medical sector in Indonesia is in great need of training, equipment, and access to information.

### **Activity 3 - April, 1994**

#### **Abbreviated APELL workshops**

With the participation of Robert Boldt, APELL expert; Harry Jayasingha, Program Coordinator, Asian Disaster Preparedness Center; and John Mehok, Health and Safety Consultant for Mobil Indonesia, WEC organized and directed two one-day abbreviated APELL workshops in Cilegon and Bandung. The seminars were designed to create more awareness and stimulate discussion among senior government and industry representatives. The material covered in the workshops focused on steps that could be taken in order to prepare for industrial and natural disasters. The results of each workshop is summarized as follows:

#### **- Cilegon:**

Approximately 60 people participated in the Cilegon workshop, and many showed considerable interest in the topics being discussed. Participation by senior level industry representatives, however, was found to be lacking. Mr. Boldt and Mr. Mehok observed that few real decision-makers were present at the days event. Therefore, the long-term impact of their discussion was left in doubt.

Mr. Boldt recommended that WEC identify a "champion" of the LAMP/APELL cause and work closely with this company, individual, or group of representatives in order to assure that the objectives of the event are well targeted, given the level of management present at the LAMP activity<sup>6</sup>. In his report to WEC, Mr. Boldt quite candidly and accurately described the dynamic between outside agencies and local constituents by saying, "Awareness, encouragement, and technical support is about all we can provide. The real work of emergency preparedness must be done by the local people. However, I firmly believe that the (program) will progress more rapidly if (local participants) feel a little bit of pressure on them because of status reports, follow-up visits, or other attention. If this commitment cannot be obtained, then questions should be asked as to whether the time, effort, and money spent is justified."

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<sup>6</sup> This recommendation is in keeping with the approach used by WEC to implement the LAMP program. As discussed below, the December, 1994 Study Tour to the U.S. allowed WEC to develop a strong working relationship with local leaders committed to the LAMP program and the APELL process.



Figure 1. Opening session for the Hazardous Materials and Emergency Response Seminar



Figure 2. Emergency response equipment on display at a LAMP seminar



Figure 3. PT Tri Polyta response team prepares for a training exercise



Figure 4. Emergency responders practice plugging leaking containers while wearing protective clothing



Figure 5. Emergency response teams working together during a mock drill activity



Figure 6. Several company response units gather to practice mutual-aid mock emergency drill



Figure 7. Response team leader communicates with incident command center while firefighters battle a staged fire



Figure 8. Evacuation of injured personnel during mock drill activity

This workshop pointed to the need for WEC to identify stakeholders in Cilegon who would truly commit to working with local groups in order to bring about the necessary changes in disaster planning, training, and infrastructure development so that real progress could be made.

- Bandung:

Approximately 55 people attended the Bandung seminar. Senior level representatives made opening remarks, which seemed to draw the attention of the other participants in attendance. Unlike Cilegon two days before, there were many senior level industry representatives in attendance, which made for a more cogent discussion. As a result, this event was quite successful, as indicated by the fact that a lively, albeit informal discussion continued for over an hour after the seminar was scheduled to conclude.

**Outcome**

As yet another part of raising awareness at LAMP sites, planning information was conveyed to the participants involved in these sessions. More importantly, as enthusiasm for these workshops was not as great as WEC had anticipated, these events indicated that WEC needed to identify the parties most interested in accident prevention and mitigation and focus program resources in their direction.

**Activity 4 - November, 1994**

**Process safety management and hazardous materials response training**

Mr. Meo I. Van Der Hooft led two APELL, CAMEO™, and Process Safety seminars in Cilegon and Tangerang. Mr. Chakthep Senivongs, LAMP Country Director for Thailand, and Jim Rountree, Texas A&M University's Texas Engineering Extension Services (TEEX), also participated in these events. Participants from Indonesia included employees from local industry, local government officials, doctors and hospital management staff, along with fire teams.

Industry representatives were very interested in hazard evaluation techniques, especially in simple analysis methods and rapid ranking procedures. Background information was distributed to help provide information otherwise not available to local groups. Medical representatives in the group spoke of their need to have more information about their roles in a chemical emergency and the need for more instruction in this area.

**Outcome**

The need to integrate emergency response among government, industry, hospital, police, and fire brigades was discussed at length and contributed to the process of nurturing support for mutual aid groups between industry. As participants gained an understanding

for the range of emergency scenarios possible, they began to see the need for better planning and precautionary measures. Thus, these sessions went a long way towards promoting the development of off-site emergency plans.

#### **Activity 5 - December, 1994**

#### **Indonesian delegation visits the United States to investigate emergency planning systems**

In December, 1994 a three party team of Indonesian delegates from the Serang Regency and Cilegon industrial complex visited the U.S. as part of WEC's effort to promote the APELL process through the LAMP program. The Indonesian delegates included Mr. Setia Hidayat, Executive Secretary for the Serang/Cilegon Regency; Mr. Wawan Hermawan, Head of the Environmental Division for the Serang/Cilegon Government Administration; and Mr. M. Nurdin, Environment Division Manager and Coordinator, Krakatau Steel.

The goal of the Indonesian delegates in coming to the U.S. was to better understand the activities and inter-relationships of various components involved with emergency response and accident planning in this country. The group wanted to meet with the Environmental Protection Agency (EPA) and the Chemical Manufacturers' Association (CMA) to learn about their respective roles in the disaster management process. In addition, the group wanted to observe well-coordinated industry and community response efforts in order to duplicate aspects of U.S. disaster planning and emergency planning systems in Indonesia. Since the group was accompanied by comparable LAMP associates from other countries, the Indonesian delegation profited from sharing experiences of other countries where WEC operates the LAMP program.

The delegation spent two weeks touring U.S. emergency response facilities and meeting with government and private organizations involved with disaster prevention and mitigation. The itinerary included visits to USAID's Office of Foreign Disaster Assistance (OFDA), The Chemical Manufacturers Association (CMA), The Federal Emergency Management Association (FEMA), EPA/CEPPO, the Centers for Disease Control and Prevention (CDC), the National Institute for Chemical Studies, and Texas A&M University's Texas Engineering Extension Services (TEEX) Spill Control Training Center. Meetings with Local Emergency Planning Committees (LEPC) in Charleston, West Virginia and Pasadena, Texas were also held to give the Indonesian visitors an understanding of these organizations' roles in the chemical emergency planning process.

The U.S. study tour provided the participating officials with an invaluable opportunity to witness and learn about the process of emergency preparedness and chemical emergency planning in the U.S. It also allowed them to meet with numerous U.S. experts and discuss options for improving planning and emergency response systems in Indonesia.

## **Outcome**

Mr. Setia Hidayat, the group leader, was particularly impressed by the level of coordination and expertise witnessed on the tour of U.S. facilities. As a result of this trip and his exposure to the U.S. prototype for disaster management, Mr. Hidayat became a champion of WEC's LAMP program in Cilegon and spearheaded many efforts to promote the APELL process in his local community. Thus, the study tour to the U.S. was of great benefit to the overall objectives of the LAMP program as it provided insight as to how the process of accident prevention and emergency response can be improved in Indonesia. In short, this activity was of invaluable benefit and marked a turning point in the LAMP Indonesia program as a whole.

### **Activity 6 - January, 1995 APELL/CEPP training program**

WEC conducted an APELL and Chemical Emergency Preparedness and Prevention workshop in Cilegon from January 18-21, 1995. The workshops were attended by some 60 delegates from local authorities, public service agencies, and industry. The workshop revealed that local leaders are well aware of the APELL process and agenda, however, adoption of the recommendation to prepare a regional emergency plan for Cilegon will not be easily ratified by all parties involved.

The anticipated difficulty in stimulating action on the part of industry representatives stems from the fact that industry typically associates only with the Ministry of Industry and Ministry of Manpower, and is not accustomed to implementing plans based on local (Serang Regency) edicts. A stronger presence by BAPEDAL is required to promote the development of an off-site emergency plan, however, BAPEDAL was not present at this workshop (See Appendix E for more information on BAPEDAL and other related GOI agencies).

This workshop pointed out the need to develop an off-site emergency plan and also take other steps to improve safety and preparedness for accidents in Cilegon. A local Chemical Manufacturers Association (CMA) has been formed, which shows promise to begin mutual aid relationships between the industries in the area. Currently, however, there is no external coordination with local fire and police brigades. Therefore, although there are challenges to nurturing support for the APELL process in Cilegon, this event proved successful in communicating to the local stakeholders what steps need to be taken in order to further the process of minimizing risk and maximizing coordination efforts in Cilegon.

## **Outcome**

The workshop supported the recommendation that the local government should prepare an emergency plan in consultation with industry groups. In reality it proved more

difficult to implement such a plan, even though the participants of the workshop included many local leaders concerned with emergency management planning. This workshop showed that building consensus for a good idea is one thing, but implementing real changes to the status quo is not so easily accomplished.

**Activity 7 - May, 1995**  
**APELL workshop**

Mr. Mark Horwitz of the EPA and Mr. Chakthep Senivongs, former LAMP Manager for WEC/Thailand, conducted an APELL seminar in Gresik in order to further develop local understanding and enthusiasm for LAMP/APELL policies and procedures. Over 75 participants attended the two day event, including managers from the industrial sector, government officials, and community leaders.

In addition, policy researchers from the State University of Airlangga in Surabaya attended the sessions to share their experience and the results of their studies on hazardous materials controls in the Gresik Industrial Zone and its impact on emergency response procedures.

**Outcome**

This workshop represented yet another step in the process of nurturing support for the APELL process and the LAMP program.

**Activity 8 - July, 1995**  
**Hazardous materials response and planning workshop**

In July, 1995 experts from TEEEX conducted a two-day seminar for plant managers, safety personnel, doctors, and public officials in order to begin the process of implementing an integrated safety plan utilizing input from the various actors. Although some of the basic material had been covered in previous LAMP activities, this workshop was designed to elevate the participants' level of understanding to assist them in developing and implementing realistic and useful safety plans. The workshop also incorporated table-top activities which tested the participants' abilities to assess various disaster scenarios. Topics covered during the workshop included Protective Equipment, Incident Command Systems, Industrial Fire Fighting, Preparing the Community, and Chemical Emergency Size-up. Video presentations and U.S. Department of Transportation (DOT) Chemical Emergency Response Handbooks were also used throughout the workshop to facilitate the instruction and stimulate discussion among the participants.

Although many of the workshop participants were regular attendees at LAMP activities, the material was presented in a way that would also be useful to people that were unfamiliar with the basic components of emergency response and preparedness planning.

Overall, the outcome of the workshop was very promising. A number of safety and planning leaders spoke forcefully during the table-top activities about the need to develop and implement integrated emergency action plans in the four industry zones in Cilegon. The feedback received by WEC about the workshop indicated that the two-day event helped prepare local safety personnel for their roles in the development of accident mitigation procedures in Cilegon.

At the time of this workshop, industry and government groups alike had a long way to go in order to develop and implement effective emergency response plans: safety equipment was needed; emergency response teams needed training; inventories of chemicals and their potential risks still had not been completed; along with other aspects of emergency planning which require resources and commitment from the local leaders. At the end of the workshop, some participants expressed frustration that there were not enough resources available to improve emergency response capabilities. Since the LAMP program is neither designed nor endowed to provide a total solution to local emergency management planning, the limitation of local resources was acknowledged, yet the possibility of improving safety internally was stressed to a greater degree.

The workshop provided local leaders with a map of options for how they could go about preparing for a chemical or industrial disaster. WEC urged participants to take responsibility for follow-through and use the planning tools and response protocols that were discussed in the workshop. The local "safety clubs" and CMA must take action and implement a plan which will capitalize on the technical expertise provided by TEEX during this workshop.

### **Outcome**

This activity was intended to mark a turning point for the LAMP program in Cilegon by providing local emergency management planners with enough information and experience so that they could then begin implementing policies advocated through the APELL process. The trainers accomplished their duties by outlining the steps involved in developing an emergency management plan, however, local leaders did not take initiative as WEC had hoped. More training, skill and leadership development was apparently needed.

### **Activity 9 - August, 1995**

#### **Presentation on medical toxicology and hazardous materials injury treatment**

Dr. Jonathan Borak, a medical emergency and toxicological treatment expert addressed a group of doctors, nurses, and other medical professionals in Cilegon in an effort to further facilitate the medical emergency management capabilities in and around this LAMP site. Dr. Borak's primary objective in meeting with this medical professional group was to explain the procedures and practices for medical emergency response to a hazardous

material incident and provide these professionals with a basic understanding of their role in a chemical or industrial medical disaster.

Dr. Borak outlined the roles and responsibilities of medical units in an emergency, and also discussed medical aspects of diagnosing, triaging, and treating victims of eye, skin, lung, and systemic exposure to chemicals. Treatment of burn victims was also discussed.

As mentioned above (see Activity 2), it is important to note the inadequacies of medical facilities in Indonesia regarding emergency response to chemical disasters. The medical training and equipment needed to modestly improve chemical emergency response and medical treatment capabilities in Indonesia is far beyond the scope of work and funding capacity of the LAMP program. So, while WEC would have preferred to conduct more extensive medical training, such an activity would not have had significant, long-term impact without the funding commitment for even more extensive training. In short, medical professionals in Cilegon and other industrialized areas of Indonesia are neither equipped nor educated to a level which would allow them to readily benefit from intensive multi-day technical programs such as those typically conducted by WEC.

### **Outcome**

The impact of this one day event was clearly evident by the enthusiasm of the 50 - 60 participants in attendance. Following the event, WEC was asked by numerous doctors and hospital managers to arrange for another, more extensive medical training. Such an activity would clearly have benefited the medical capabilities in Cilegon, however, it was not possible to conduct such a follow-up visit due to the budgetary constraints of the program. An extensive and sustained approach to medical emergency preparedness is required.

### **Activity 10 - September, 1995**

#### **Cilegon leaders host Gresik delegation to discuss emergency preparedness**

The group was comprised of managers of 20 industries and ten local government officials from various agencies in Gresik area. The presentations given by Ir. Setia Hidayat and Ir. Wawan Hermawan, Endy Muslim of ARCO, and Harry Wiradiputra, covering background, development, progress and programs of Emergency Response Systems for Serang/Cilegon were in line with APELL/LAMP patterns. Dr. Nurdin from Krakatau Steel gave further briefings on the technical LEPC set up at Krakatau Industrial Estate, followed by visits to Krakatau Steel's Firefighting Training Facilities and ARCO's plant site.

On the second day, the group visited the BAPEDAL Office in Jakarta and was briefed by the Vice-Head of BAPEDAL and their expert officials on emergency response to industrial disaster.

In this meeting, the group from Gresik, relative newcomers to the LAMP program, learned much about the internal steps needed to be taken by government and industry in order to implement policies and practices discussed in LAMP workshops and technical training activities. Cilegon was able to demonstrate and explain their plan for developing integrated emergency response procedures, which included improving training facilities and conducting mock drill activities.

### **Outcome**

In accordance with the philosophy that the LAMP program should replicate achievements between program sites, this activity brought together leading representatives from the two primary sites in Indonesia. The importance of initiating and supporting such interchanges cannot be overemphasized. Time and time again, as was the case with this meeting, the interaction between industry and government representatives from different LAMP sites creates an atmosphere of competitive enthusiasm for improving emergency planning procedures and capabilities. This experience sharing allowed leaders from both sites to discuss future plans and past experiences regarding emergency management planning. Since Gresik had had less exposure to the LAMP program it was an opportunity for them to benefit from the experience of industry representatives in Cilegon.

### **Activity 11 - October, 1995**

#### **CAMEO™ and hazardous materials emergency response workshop**

This activity was developed in response to several needs which WEC wanted to address in a cost effective manner. The two workshops in Cilegon and Gresik were intended to enable response teams to conduct mock emergency drills and continue developing skills without WEC's direct involvement. Although the level of sophistication would vary from Cilegon to Gresik, the point was to inspire groups from both sites to engage the practice of rehearsing emergency scenarios. Approximately 60 people attended each workshop.

The first goal was to provide response teams with information, planning tools, and technical expertise that they would need in future training scenarios and field exercises that WEC planned to conduct. The level of training varied between Cilegon and Gresik, but the goal for each LAMP site was the same: to prepare response groups for hands-on technical training and mock drill activities. TEEEX conducted this aspect of the workshops concerning hazardous materials emergency response.

Second, as a result of Dr. Borak's visit to Cilegon in August, WEC recognized a need to provide medical professionals with a step by step outline for how to go about assessing chemical risk and response capabilities and how to develop a plan suitable to the conditions at a given location. Although it was not possible to send Dr. Borak back to Indonesia for this purpose, WEC worked with him to develop a presentation that

provided doctors, nurses, and paramedic responders with a framework for participating in emergency response scenarios. Such a planning tool was essential to both Cilegon and Gresik, because it enabled groups from both LAMP sites to truly integrate the medical role into the disaster management planning process.

Finally, to reinforce previous discussion of CAMEO™, another presentation was included to demonstrate how CAMEO™ management tools work and investigate possible applications for use in Indonesia. BAPEDAL representatives attending the session in Cilegon commented that CAMEO™ can and should be used to a greater degree in Indonesia, and that their agency would begin using CAMEO™ as a planning tool.

### **Outcome**

These activities accomplished the primary goal of preparing emergency response personnel at each LAMP site for conducting mock emergency drills. Discussion of the medical roles of emergency response allowed industry response teams to better understand the roles played by doctors and paramedics during an emergency response procedure.

### **Activity 12 - March, 1996**

#### **Community awareness workshops**

WEC and a representative from the Pasadena, Texas LEPC conducted back to back train the trainer organizing workshops in Cilegon and Gresik in March, 1996. As part of WEC's ongoing commitment to involve and empower local leaders in accident prevention and preparedness at the local level, WEC organized and conducted these community awareness workshops. Mr. V. Srinivasan, WEC Project Manager, and Ms. Sandra Gabbert, Information Coordinator for the Pasadena, Texas LEPC directed two day workshops in Cilegon and Gresik. Participants at each workshop came from public offices, private companies, and community-based organizations as well.

The two day workshops were broken down into two sections. On the first day, the workshop leaders made a series of educational presentations to give participants an understanding of the roles of LEPC's in the U.S. and other countries where WEC has worked to promote community awareness and grassroots involvement of accident planning. Legal and regulatory parameters were also discussed in these lectures. As with other WEC community awareness workshops, presentations were designed to leave participants with the notion that access to information, combined with their desire to improve safety and minimize risk, is a solid formula for improving accident preparedness at the local level.

The second day consisted of a series of interactive group sessions designed to stimulate discussion and allow participants an opportunity to implement the theories and methods

discussed the previous day. Ultimately, each group was asked to develop an appropriate method of community involvement that could serve to improve the safety factors in an emergency situation. The group work required communication between the various sectors present during the workshops — government, industry, and private citizen groups — which proved to be a very valuable and stimulating interaction. Groups were also asked to strategize methods for disseminating information throughout the community and select organizations that would effectively handle this task of improving awareness.

### **Outcome**

Participant response to the community awareness workshops indicated that the workshops were useful in facilitating discussion on numerous issues and roles associated with emergency response and disaster management planning. The activities were also useful in that they included the community groups in the LAMP process. As a result of these seminars, private citizens can claim a larger stake in disaster management planning, as they now understand better their potential roles and the need to engage government and industry leaders in the planning process.

### **Activity 13 - June, 1996**

#### **Hazardous Materials Emergency Response Training**

Trainers from TEEEX conducted two back-to-back three and one-half days of lecture, table-top exercises, and an emergency response field exercise to simulate a chemical spill involving injured civilians. Over 100 participants took part in the activities which were conducted in both Cilegon and Gresik. Both groups were composed of representatives from government and industry.

Participants were acquainted with many concepts involved in the safe approach to emergency situations involving hazardous materials. Topics covered during the courses included:

- Chemical toxicology;
- Decontamination of exposed personnel and equipment;
- Containment procedures for chemical spills;
- Communications protocol and planning;
- Incident command at the scene of an emergency;
- Chemical protective clothing and levels of protection;
- Chemical detection instrument operation; and
- Emergency situation assessment and decision making ;

Practical exercises and problem solving drills were conducted to impress upon participants the practical aspects of topics presented in the classroom. A field exercise was scheduled at the end of each workshop to test student comprehension of the material covered and also give participants experience in performing under the pressure of an emergency situation.

The field exercise simulated a vehicle collision involving a truck carrying dangerous chemicals and a passenger vehicle. The scenario included an unconscious victim requiring evacuation by emergency response personnel and subsequent chemical decontamination of responders and the victim. Responders were radio equipped and were required to initiate the incident command system protocol to successfully handle all aspects of the simulated emergency. Participants performed very well in Cilegon and were successful in applying the technical material and response protocols as instructed. A critique of the scenario was offered after completion of the exercise and student questions were answered. Participants in Gresik were somewhat less successful in handling all aspects of the simulation but did perform satisfactorily overall.

### **Outcome**

Although participants in Cilegon and Gresik differed in their understanding of emergency response procedures, the simulated field exercise served a similar purpose for each group. Although mistakes were made, participants learned valuable lessons about preparing for chemical emergencies. First, the feedback given following the drill exercise pointed to areas where skills were lacking and more training was needed. Second, participants took with them the valuable knowledge that only comes from “doing” what, previously, had only been discussed in class. Therefore, for both groups, it was clear that participants had benefited from the activity and would likely perform future drill activities to continue developing skills. These important lessons were learned first hand.

### **Activity 14 - August, 1996**

#### **Mock emergency drill conducted in Cilegon**

The culmination of the LAMP program in Cilegon came in the form of a mock emergency drill which put to the test many of the skills and principles WEC has worked to develop. The drill comprised emergency response units from five different plants in Zone I of the Cilegon Industrial Estate and simulated a response to a fire in a naphtha tank storage area of one of the petrochemical plants. The exercise was evaluated by senior officials from industry, by the WEC Country Director, and by the local head of the Serang Regency. A debriefing on the exercise was led by two emergency response team members in the presence of all emergency responders from other teams in the Cilegon complex.

### **Outcome**

This drill activity indicates that the LAMP program achieved a critical goal in the process of improving emergency preparedness and planning. Emergency response expertise is now at a point where local groups can train on their own and continue to prepare for chemical emergencies and industrial accidents. This is an important first step toward developing emergency response capabilities that compare to the risks posed by industry.

The drill allowed responders to practice communications, emergency assessment, containment, medical evacuation, and many other important aspects of emergency response in a real-time, real-life scenario. Furthermore, the activity truly engaged the concept of mutual-aid which is much needed at industrial sites where resources are few and potential problems great; teams from five different industries participated in the exercise.

The next drill activity is currently being planned for December, 1996. In light of the impending national level legislation that will strengthen industrial emergency preparedness requirements, this next mock emergency drill is seen as a very important event that will draw national media coverage and be witnessed by over 150 officials from all levels of the GOI. The Minister of Environment has taken a special interest in this activity and is inviting nine regional governors to attend along with numerous other top officials. Gresik will also send a team of observers to witness the event and meet with participants and organizers.

At the time this report went to press, WEC was actively involved in planning the activity and coordinating with local organizers to help ensure that the drill was both challenging and feasible, given local capabilities. This will be the first mock drill in Indonesia to include the evacuation of community members. Thus, it represents a turning point in the development of emergency preparedness in Indonesia and the full adoption of the APELL process.

Finally, it should be noted that the other three emergency response groups in Cilegon have also scheduled separate drill activities as a result of the leadership role taken by the Zone 1 emergency response team. Although the drill activities in Zones 2, 3, and 4 will be of a smaller scale, they indicate that the LAMP program has had a positive influence among a broad range of industry groups in Cilegon.

## V. IMPACT, SUSTAINABILITY, AND REPLICATION

In the two primary sites of Cilegon and Gresik, the LAMP Indonesia program allowed industry and government leaders to begin developing adequate emergency response and planning systems in environments where, previously, relatively few systems were in place. World Environment Center (WEC) conducted numerous training and workshop activities which facilitated the process of developing local capabilities. Since similar activities had not been conducted prior to the LAMP program, the LAMP program raised the level of awareness and education to a great degree, and provided local leaders with a basis of information and understanding that will allow them to continue to make progress for years to come.

In terms of the LAMP project's sustainability, additional support will be needed to continue the work conducted with funding from the Office of Foreign Disaster Assistance (OFDA). WEC is actively pursuing possible sources of funding from various Government of Indonesia (GOI) agencies, and is also looking to its International Environment Forum (IEF) members that have a presence in Indonesia to support the continuation of the LAMP program in Cilegon and Gresik.

Due to regulations recently introduced by the GOI to strengthen industrial safety and emergency planning throughout Indonesia, the significant impact of the LAMP program is likely to be felt in the immediate future. While the new regulatory conditions have yet to be enacted, GOI is taking steps to improve safety and planning conditions related to industrial development. When these laws come into play, the private and public sector groups that have worked with WEC will be better prepared to improve safety conditions and initiate activities promoted by the LAMP program.

Emergency response teams in Cilegon and Gresik simply have a head start in the process that appears likely to take place throughout Indonesia. Replication of the results achieved in Cilegon and Gresik will likely be possible once tougher laws force industry groups to take more responsibility for the potential risks that their businesses pose to the communities where they operate. Once other industrial complexes have this legislated impetus to improve safety and emergency management policies, a productive replication of the LAMP program will be possible. Leaders in Cilegon and Gresik have taken great strides to review and improve their own emergency management plans, and they will be a valuable resource for other industrial centers attempting to do the same.

## VI. LESSONS LEARNED

- In developing countries, such as Indonesia, where emergency response capabilities are inadequate in relation to the risks posed by development, WEC relies heavily on multinational companies to champion the LAMP program and provide examples of how appropriate safety mechanisms can be developed. WEC's interaction with large and small companies in Cilegon and Gresik indicates that the larger multinationals have better worker safety and emergency response protocols in place. These companies are in a better position to implement policies and practices that the LAMP program supports.
- Regular contact between local stakeholders from different LAMP sites and the exchange of information that results from these types of interaction is an effective way of motivating and mobilizing local stakeholders. Meetings between representatives from the two LAMP sites of Gresik and Cilegon achieved a dynamic catalytic effects which allowed the LAMP program to move forward in both locations. Similar results were achieved when Indonesian delegates visited the U.S. to meet with emergency response professionals and learn about options for improving emergency preparedness. The value of such exchanges should not be underestimated, and WEC hopes that leaders from Cilegon and Gresik have opportunities to share their experience with the LAMP program and understanding for the Awareness and Preparedness for Emergencies at the Local Level (APELL) process in other industrial facilities throughout Indonesia.
- The long-term impact of LAMP activities can be linked to the available resources on the local level at any given LAMP site. Although WEC effectively introduced the APELL process and developed support for improving emergency response capabilities, financing always remained a question in the minds of local participants. As resources for improving emergency response systems become available, the local leaders will be in a better position to implement the policies and procedures advocated through the LAMP program.
- WEC's experience in working with Government of Indonesia (GOI) agencies during the site selection phase of the LAMP Indonesia program indicates the problematic nature of a top-down approach in implementing LAMP programs. To develop local level support for the LAMP program, WEC recommends and, whenever possible, relies on a bottom-up approach which involves a high degree of interaction with local leaders. LAMP works best when WEC, local leaders, and national level representatives cooperate to reach a joint decision which satisfies the program criteria.

**Appendix A**  
**Chronological Summary of LAMP Indonesia Activities**

<b><u>Date</u></b>	<b><u>Activity</u></b>
February, 1993	Initial meeting with BAPEDAL to discuss LAMP program orientation for Indonesia.
December, 1993	Responsible Care and Health Seminar conducted in Cilegon.
January, 1994	BAPEDAL conducted seminar in Bandung on cleaner production.
March, 1994	Medical Response seminar conducted in Cilegon.
April, 1994	APELL seminars conducted in Cilegon and Bandung.
May, 1994	Meeting held to follow-up on APELL seminars and discuss possible CMA roles in LAMP sites.
August, 1994	OFDA team visited Bandung and met with local BAPEDAL officials to discuss LAMP/APELL issues.
October, 1994	APELL workshops are conducted in Cilegon and Tangerang.
November, 1994	Indonesian delegation visited U.S. to investigate safety and emergency response systems and meet with policy makers and experts in the field.
January, 1995	APELL workshop conducted in Cilegon.
March, 1995	Meeting held with Cilegon LEPC to review emergency response schedules and fire fighting training facilities. Separate discussions were also held with leaders from the Gresik Industrial Zone.
April, 1995	Meeting held with local CMA in Cilegon. WEC makes a presentation on emergency response training programs and how they can benefit local response groups.
May, 1995	LAMP/APELL seminar held in Gresik.

June, 1995	Meeting held with Dr. Soeriaatmadja.
July, 1995	WEC met with Gresik Industrial Zone management, Cilegon CMA, and Krakatau Steel Safety officials. In late July, WEC conducted an Emergency Response and Crisis Management workshop.
August, 1995	WEC conducted a two-day seminar for doctors and paramedics on Medical Emergency Response.
September, 1995	WEC/Indonesia met with WEC/Thailand and Government of Thailand (GOT) officials in Bangkok. A meeting was held in Gresik to discuss integration of roles and responsibilities between private emergency responders and local government sectors. In Cilegon, WEC conducted an exchange meeting between Gresik emergency response study group and Cilegon LEPC members.
October, 1995	Meeting with Gresik and Cilegon emergency response groups. WEC also conducted an Emergency Response Seminar in Cilegon.
November, 1995	Petro Group Industrial Complex formed an LEPC in Gresik.
December, 1995	Meeting with Cilegon CMA. Ciwandan Emergency Team conducted a fire drill exercise.
January, 1996	LAMP/APELL programs were conducted in Cilegon (Anyer Zone) and Gresik. Following the seminars, WEC held meetings to discuss improving emergency response procedures.
February, 1996	WEC/LAMP met with leaders in Cilegon.
March, 1996	WEC conducted Community Awareness workshops in Cilegon and Gresik.
April, 1996	Bojonegara Emergency Response Team was formally established, with support and guidance from WEC.
May, 1996	Meeting with local government and industry officials to discuss Hazmat Training scheduled for June, 1996. In Gresik, WEC met with Petro Group to discuss their preparation for the same course to be taught.

June, 1996

Mock drill exercise conducted in Cilegon (Merak Zone).  
Hazmat & Emergency Response training conducted in  
Cilegon and Gresik.

August, 1996

Mock emergency drill conducted in Cilegon.

**Appendix B**  
**Observations on Hospital Preparedness for Industrial Accidents in Jakarta and Serang Regency (Cilegon)**

1. Sources of information, or databases on toxic chemicals are virtually nonexistent for physicians and public health authorities needing data on chemicals in an emergency (i.e. no poison or chemical information centers currently exists in Indonesia);
2. There is minimal intersection or interagency cooperation in the area of preparedness, prevention, mitigation and response to chemical or industrial accidents. For example, very little communication is on-going between hospitals and other institutions, government agencies, industry and organizations with some responsibility for industrial disaster preparedness and response.
3. Most hospitals surveyed have at least a written internal and external disaster plan. None had specific procedures in place for response to chemical and/or industrial accidents.
4. Most hospitals have disaster triage protocols at least on paper, however, few practice their procedures.
5. No hospitals surveyed have a designated entrance for chemically contaminated casualties.
6. No hospitals surveyed have separate areas where contaminated patients can be isolated from other patients.
7. None of the hospitals surveyed have proper ventilation for hazardous material decontamination.
8. Personal protective equipment for staff is limited to surgical gowns, gloves and masks. No hospitals surveyed had self-contained breathing apparatus available.
9. Decontamination equipment was not available at any hospitals surveyed except for soap and water (i.e. no scrubbing tools, water impermeable barrier material, collection system for contaminated water, etc.).
10. Only atropine, as the antidote to organophosphate pesticide poisoning, was available at the hospitals surveyed.
11. Most hospital emergency personnel had only limited knowledge of chemicals in production in the community and/or in transit through the community.
12. Only Serang Public Hospital had drills for disasters, either natural or technological
13. With the exception of the Pertamina Hospital in Jakarta (Pertamina is the state-run petroleum company whose hospital reportedly has specialty beds for employees severely burned on the job), there are no specially designated burn unit beds available in all of Indonesia.
14. Only one hyperbaric chamber is available for severe carbon monoxide poisoning in all of Indonesia (located at the Navy Hospital in Jakarta).
15. Responsibilities of the national, provincial, regional, and local emergency services have not been delineated in regard to the following: chemical or industrial accidents for first aid care, patient transportation; hospital treatment, post-accident review, and reporting of chemical accidents.
16. There is no training available for chemical risk assessment and management of chemical accidents.

**Appendix C**  
**Companies and Products Used in the Cilegon Industrial Complex**

<u>Name of Company</u>	<u>Product/Service</u>
<b>Zone I - Ciwandan</b>	
1. PT. Arco Chemicals Ind.	Polyols
2. PT. Asahimas Subentra Chemicals	Polyvinyl Chloride / VCM PVC
3. PT. Chandra Asri	Olefine / Nafta Cracker
4. PT. Dong Jin Indonesia	Organic Chemicals
5. PT. Lautan Otsuka Chemicals	Blowing Agent
6. PT. Polypet Karya Persada	Polyvinyl
7. PT. Tripolyta Indonesia	Polypropylene
<b>Zone II - Cilegon</b>	
8. PT. Airliquide	Liquids
9. PT. Aneka Gas	Gas Terminal
10. PT. Argamas Bajatama	Steel Products
11. PT. Barata Indonesia	Machinery Components
12. PT. B C A	
13. PT. BHP Steel Indonesia	Steel Mill & Processing
14. PT. Cabot Chemicals	Carbon Black
15. PT. Chicago Bridge & Iron	Tank Fabrication
16. PT. Cilegon Heabem Center	Heabem Iron / Steel
17. PT. Cokro Putra Persada	Machinery Shop
18. PT. Commonwealth	
19. PT. Daekyung Indali Heavy Industry	Metal Products
20. PT. Duta Waskita Baja	Steel Products
21. PT. Hoechst Cilegon Kimia	DyeStuff
22. PT. I M P I	Machinery Components
23. PT. Indaref	Fire Brickets for BoiieFs
24. PT. Kapurindo Sentana Baja	Lime for Steel Mills
25. PT. KHI	Steel Pipes
26. PT. Krakatau Prima Dharma Sentana	Alumunium Pallet
27. PT. Krakatau Steel	Steel Mill
28. PT. Krakatau Wajatama	Steel Mill
29. PT. Kratama Belindo Int.	Steel Frames
30. PT. Latinusa	Tin Plates
31. PT. Mitra Guna P	
32. PT. Multifabrindo Gemilang	High Pressure Containers
33. PLTU	400MW Power Plant
34. Pelsus Cicading	Cargo Pier/Port
35. PT. Prokind	
36. PT. Purna Baja Hecket	Steel Processing
37. PT. Samudra Ferro Eng.	Maintenance Shop
38. PT. Sankyu	
39. PT. Siemens Indonesia	Turbo Components

- 40. PT. SPIJ
- 41. PT. STC Primkokas JD
- 42. PT. Summimagne Utaina
- 43. PT. Tiskna Yasa
- 44. W S K Krenceng

Steel Piping  
Magnet Iron  
Briket Pig Iron

**Zone III - Pulomerak**

- 45. PT. Bakrie Kasei Corp.
- 46. PT. Bumi Merak Terminalindo
- 47. PT. Dow Polymers Indonesia
- 48. Dover Chemicals
- 49. PT. Kekar Plastindo
- 50. PT. PENI
- 51. Pertamina UPPDN III
- 52. Pertamina UPKK Lanin MJT
- 53. PT. PIPI
- 54. PT. Prointal
- 55. PT. Santa Fe Pomeroy
- 56. PT. Statomer
- 57. PT. Unggul Indah Corporation
- 58. PT. United Air Product

Purified Teraphetalic Acid  
Liquid Chemicals Terminal  
Polystyrene  
Formaldehyde/Glue (PVA)  
Plastic Containers  
Polyethylene  
Gasoline/Diesel Oil Terminal  
Oil Tank Terminal  
Polystyrene  
Tank Terminal (Chemicals)  
Offshore Oil Pier  
PVC Resin  
Alkyl Benzene  
Liquid Oxygen

**Zone IV - Bojonegara**

- 59. PT. Bima Kimia Nufarm
- 60. PT. Continental Carbon Ind.
- 61. PT. Inti Everspring Ind.
- 62. PT. Meisel Sarana Indonesia
- 63. PT. PLTU Saralaya
- 64. PT. Polychem Lindo Inc.
- 65. PT. Prima Ethycolindo
  
- 66. PT. Redeco Petrolin Utama Inc.
- 67. PT. Rhone Poutenc Indolalex
- 68. PT. Risjad Brasall Styrimdo
- 69. PT. Styrimdo Mono Ind.
- 70. PT. Sulfindo Adi Usaha
- 71. PT. Suralaya Prakarsawood Industry
- 72. PT. Trans Bakrie

Pestiside  
Carbon Black  
Pestiside  
Shipping Docks  
Power Plant  
Polystyrene  
Monoethylene, Diethylene,  
Triethylene Glicol  
Liquid Chemical Terminal  
Latex  
Expandable Polystyrene  
Styrene Monomer  
Ethylene Dichloride  
Table Top, Moulding  
Steel Construction

**Appendix D**  
**Companies and Products Used in the Gresik Industrial Complex**

<u>Name of Company</u>	<u>Product/Service</u>
<b>Zone I - Kec. Manyar &amp; Gresik</b>	
1. PT. Albright & Wilson Manyar	Surfactan
2. PT. Intan Ustrix	Carton Boxes
3. PT. Kawasan Industri Gresik	Industry Group Management
4. PT. Liku Telaga	Sulphate Acid & Alum
5. PT. Maspion Industrial Estate	Electronic Products
6. PT. Pelabuhan III	Public Port/ Pier
7. PT. Petro Kayaku	Pesticide
8. PT. Petrocentral	S T P P
9. PT. Petrokimia	Fertiliser
10. PT. Petronika	Diocetyl Phthalate (DOP)
11. PT. Petrosida	Pesticide
12. PT. Petrowidada	PA & MA
13. PT. S U C P	R e s i n
14. PT. Sasana Citta Husada	Pharmac
15. PT. Tambang Batubara BA	Coal Brickets
16. PT. Wiharta Karya Agung	Plastic Containers
<b>Zone II - Kec. Kebomas</b>	
17. PT. Barata Indonesia	Steel / Machinery Parts
18. PT. Dahana Energi Utama	Coke Brickets
19. PT. Etemit	Plasterboard
20. PT. Indospring	Spring Products
21. PT. Inhutani I	Wood Products
22. PT. Kodeco Ltd.	Gas
23. PT. MK Prima	Brakes Canvas
24. PT. Nipsea Paint & Chem. Co. Ltd.	Paints
25. PT. Nusantara Plywood	Wood Products
26. Perum Gas Negara	Gas Terminal
27. PT. PLN PJB II	Power Plant
28. PT. Semen Gresik	Cement
<b>Zone III - Kec. Driyorejo &amp; Wringinanom</b>	
29. PT. Adiprima Sura Printa	Paper
30. PT. Adya Buana Persada	Ceramics

**Appendix E**  
**Description of BAPEDAL and other GOI Agencies Working with LAMP Indonesia**

The following information concerning GOI agencies is found in WEC's Indonesia Country Profile, which was published in 1992, the same year that WEC initiated the LAMP program.

**BAPEDAL** - The Environmental Impact Management Agency (Badan Pengendalian Dampak Lingkungan) — BAPEDAL was established in June of 1990 by the President to assist him in controlling pollution, managing the production of hazardous waste, preventing environmental degradation, and implementing the Environmental Impact Assessment process in Indonesia. BAPEDAL is an outgrowth of the environmental pollution control subministry within The State Minister of Population and Environment (KLH) and, as such, has assumed an environmental regulatory function, leaving KLH to be a policy-setting and coordinating agency. Nevertheless, BAPEDAL is headed by the Minister of KLH and operates under the auspices of its parent organization. As of 1992, the tentative functions of BAPEDAL include:

- To serve as the source for all review and permit issuance, including the environmental impact statement and review process. At present, responsibility and authority for these activities are diffused through several different agencies and ministries, most notably the Department of Industry, KLH, and the National Development Planning Board (BAPPENAS). BAPEDAL will take over full administrative responsibility for this essential aspect of environmental regulation.
- To administer the new PROKASIH "Clean Streams" program, meant to promptly address the issue of industrial pollution in the country's major rivers.
- To develop guidelines for hazardous waste management and spill contingency plans.
- To set up and implement baseline monitoring programs for surface waters, ground waters, and air sheds.
- To establish the legal authority to administer these environmental regulations.
- To implement exemplary Regional Environmental Management Plans (REMPS) to demonstrate the efficacy of the regional approach for controlling environmental impacts and achieving resource objectives.
- To establish and coordinate a system of Provincial and District BAPEDAL Offices, which will assist in implementing the central BAPEDAL Office's programs. Licensure will be an important activity for these regional offices.

31. PT. Agrindo  
32. PT. Emdeki  
33. PT. Huey Chyi  
34. PT. Mekabox  
35. PT. Miwon  
36. PT. Samator  
37. PT. Surya Kertas  
38. PT. Timur Megah Steel  
39. PT. Wing's Surya

Agricultural Equipment  
Carbide  
Dyestuff  
Carton Boxes  
Monosodium Glutamate  
Gas Acetylene, Oxygen  
Pulp & Paper  
Steel Wire  
Soap

There is much overlap between BAPEDAL's proposed functions and those of the Department of Industry and BAPPENAS, particularly with respect to environmental impact reporting, licensing, and monitoring procedures. Since BAPEDAL is a relatively new organization, it remains to be determined how this redistribution of authority and organization will be negotiated on paper and in practice.

GOI agencies sharing responsibility for the environment, worker safety, and industrial development are as follows:

**KLH - Office of the State Minister of Environment** (Kantor Menteri Negara Lingkungan Hidup). A "non-departmental" agency established in 1983 to plan and formulate GOI policy, "coordinate and take action" in activities related to environmental management, and to report to, inform, suggest, and advise the President on his responsibilities in these matters. The office's responsibilities also cover population and family planning matters. It can suggest environmental standards for enforcement by the Provinces and central Government departments. Thus, it interfaces with everybody, but has no real jurisdiction or enforcement programs. BAPEDAL was separated from KLH with the intention of meeting this insufficiency.

**The Department of Industry** (Departemen Perindustrian). In contrast to KLH, Perindustrian is a "departmental" ministry. That is, it has executive/enforcement powers. Perindustrian's responsibilities include: overseeing the environmental impact analysis process, granting operating permits, setting and enforcing the pollution and environmental quality standards, taking action against violators, and monitoring and responding to accidents and catastrophes caused by industrial pollution. These responsibilities also apply to toxic and hazardous waste management and industrial site selection.

**BAPPENAS - National Development Planning Board** (Badan Perencanaan Pembangunan Nasional). Under the Chairmanship of the Minister of State for National Planning, BAPPENAS is responsible for assessing development plans of central and provincial Government agencies. Other ministries dealing with environmental responsibilities - Forestry, Agriculture, Public Works, and Industry must also submit environmental regulation and development plans to this Bureau. The Bureau has the power to alter or withhold approval of project plans. This represents significant power, since any major development or investment requires an approved project plan.

**DEPDAGRI - Department of the Interior** (or "Department of Home Affairs") (Departemen Dalam Negeri). DEPDAGRI is an extremely powerful Ministry. It has authority over all Provincial and Daerah governments. Thus, while theoretically there is considerable local power in environmental regulation, the reality is that all 27 of the Republic's Governors actually are under the authority of this department.

LAMP Indonesia Impact Table

Performance Indicators	Baseline	Cumulative	Final Quarter Activities
<p><b>1. Emergency Groups Formed</b></p> <p>1.1 increased preparedness</p> <p>1.2 more responders</p> <p>1.3 site replication</p>	<p>Industry mutual aid groups (BILIKs) in place; no community representatives.</p> <p>Few local community representatives (government &amp; public)</p> <p>Few trained emergency responders</p>	<p>Links between SATKORLAK PBAs and BILIKs (mutual aid groups) in Serang (Cilegon) &amp; Gresik Counties</p> <p>Municipal authorities from cities nearby to Cilegon &amp; Gresik are involved</p> <p>Medical response seminars held in Cilegon &amp; Jakarta</p> <p>BAPEDAL drafting a decree to authorize LEPGs at all industrial estates in Indonesia and have asked WEC to assist in this expansion.</p>	<p>Cilegon CMA formed and meeting on regular intervals</p> <p>Cilegon public will participate in emergency exercise evacuation in November</p> <p>Mutual aid group in Cilegon conducted large exercise in August involving fire safety and medical response personnel</p>
<p><b>2. Increased Awareness</b></p> <p>2.1 by community</p> <p>2.2 by industry</p>	<p>No community exercises conducted before</p> <p>Only few large firms have emergency plans</p>	<p>Improved awareness in cities near chemical industries</p> <p>Cities near to Cilegon &amp; Gresik</p> <p>Cilegon and Gresik have separate Emergency Response Teams in four different zones</p>	<p>Cilegon public will participate in emergency exercise evacuation in November</p> <p>Industry mutual aid relationships formed.</p>
<p><b>3. Improved Response</b></p> <p>3.1 plan testing</p> <p>3.2 national network</p>	<p>Poor integration of on &amp; off-site emergency response planning</p> <p>No community exercises conducted before</p> <p>BAKORNAS PBA for natural disasters</p>	<p>Improved coordination of industry &amp; government planning in Serang and Gresik Counties</p> <p>Cilegon and Gresik exercises being planned</p> <p>GOI adding technological disaster planning to BAKORNAS PBA</p>	<p>Large emergency response exercise with off-site evacuation scheduled for November in Cilegon, in presence of BAPEDAL.</p>