A Report on Training Programs
for Lesser Developed Countries

THE ASEAN ENERGY II

COAL TECHNOLOGIES TRAINING PROGRAM

An Analysis

Prepared for

AGENCY FOR INTERNATIONAL DEVELOPMENT
Office of Energy
Washington D.C.

W. KENNETH DERICKSON
President

INTENT, INC.

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INTRODUCTION

The development and implementation of the ASEAN Energy II Coal Training Program was one of the most successful training efforts experienced by the author during his employment in the International Section of Argonne National Laboratory's Division of Educational Programs. This success was in large part due to AID's (specifically, Dr. Robert F. Ichord's, ASIA/TR/EFE) appreciation of the special training requirements for staff from lesser developed countries and its support of the training staff's efforts. This appreciation and understanding enabled the training staff to (1) select appropriate participants for the program, (2) tailor the program to meet the needs of the ASEAN countries, (3) mobilize appropriate private sector resources to assist in the implementation of the program, and (4) see to the professional and personal needs of the participants. The relevance of these four elements to successful international programs will be the essence of this report.

The purpose of this report is to document the rationale for the ASEAN Energy II Coal Training Program based on the strengths and weaknesses of other international training programs familiar to the author. The effectiveness of this program is evaluated on the basis of formal and informal feedback. The purpose and application of the training manual developed from this program is also discussed and recommendations regarding future AID coal training activities provided.

RATIONALE

The ASEAN Energy II Coal Training Program was formulated on the basis of the author's previous international training experience and accumulated feedback from participants in his programs, funding agencies and other training professionals. From this experience and feedback, the author and his staff developed and implemented a program that addressed problem areas identified in many other international training programs. These are summarized in Table 1.

ELEMENTS OF SUCCESSFUL TRAINING PROGRAMS

The keys to developing any successful training program are good communications and flexibility. This is particularly true for international programs, since the trainees are typically in strange surroundings and there are differences in culture, language and stages of technological development between the host and recipient country. Special training skills are required to present information in a relevant manner, while paying close attention to the trainees' personal needs. Many training programs fail to consider these differences, or do so

inadequately. As a result the program falls short of the trainee's, their employer's, funding agency's and the training

TABLE 1. COMMON PROBLEM AREAS IN INTERNATIONAL TRAINING.

SELECTION OF TRAINEES
Vague or Poorly Defined Training Objectives
Improper Backgrounds or Job Levels
Insufficient Experience or Inappropriate Interests
Inadequate English Skills
PROGRAM DEVELOPMENT AND IMPLEMENTATION
Course Content
Vague or Poorly Defined Technology Needs
Inappropriate Technology or Technology Level Emphases
Too much Information in Available Time
Limited Active Participation in Program by Trainees
Lack of Continuity in Lecture Presentations
Limited Opportunities for Practical Application of Knowledge
Lack of International Experience by Invited Lecturers
Course Structure
Insufficient Mix of Active and Passive Learning Methods
Improper Scheduling of Active and Passive Learning Methods
Lack of Synchronization of Learning Methods
Inconsistency in Quality and Type of References Materials
Lack of Appropriate Training Manual
Limited Attempts to Promote Interactions and Team Work
Little or No Flexibility in Program Content or Schedule
Administration
Information Flow to Participants Not Timely
Insufficient Training Support Staff
Participants' Access to Training Staff Limited
Lack of Adequate Monitoring of Trainee Needs
Insufficient Attention to Social Activities
Lack of Information on Training Country and Organization
Paternalistic Attitude Toward Trainees by Training Staff
PROGRAM EVALUATION AND FEEDBACK
Minimal Attempts by Staff to Obtain Constructive Feedback
Self-serving Recommendations by Staff to Funding Agency
No Follow-up Evaluation of Program Effectiveness

staff's expectations. This, in turn, can result in a reluctance to enter into future training programs and does little to promote strong working relationships between the technological

communities in the host and recipient countries.

In order to avoid the above problems and to enhance the effectiveness of training programs, all parties must actively communicate at all stages of program development and implementation. These stages are:

- Defining the objectives and scope of the training program.
- Developing the training program philosophy and approach.
- Implementing the training program.
- Monitoring of the appropriateness of the training program and making adjustments as needed.
- Evaluating the results of the training program.
- Providing appropriate feedback and recommendations to the funding agency.

It is essential that communications be on a face-to-face basis between all parties, to the extent possible. Information can be conveyed in a more timely manner and in greater detail on this basis than by paper or phone conversations. Also, it helps build confidence, trust and understanding between the parties which is critical to effective communication.

Defining Objectives and Scope of Training

All too often the recipient countries have vague ideas about their training needs, available training methods and how to select appropriate personnel for training. For a variety of reasons, either the funding agency or, more importantly, the training organization fails to provide the proper guidance. In fact, in many cases the training staff may never meet with foreign officials or the proposed candidates for the program. Additionally, the training staff may have very little knowledge of the customs and level of technological development in the recipient country, or worse yet they decide what the country should do technologically.

Given these conditions, it is difficult to determine training needs, the appropriate training methods and the type of trainees to select. Training needs may be general or specific, short- or long-term, limited or comprehensive or a combination thereof. The five basic types of international training and relevant characteristics are shown in Table 2. General or overview types of programs are usually appropriate for policy/management staff. Specific courses are more technical and involve the understanding and application of specific methods and procedures. Short-term programs (workshops, short courses and technical assistance) are problem-oriented or used for retraining or upgrading the skills of employed staff; whereas, long-term

programs typically are degree-oriented and prepare college or high school graduates for entry level positions. Mid-term on-the-job training is suitable for upgrading and retraining employed staff. Training requirements for some technologies may

TABLE 2. TYPES , DURATION AND PURPOSES OF INTERNATIONAL TRAINING ACTIVITIES.

TYPES/PURPOSES	DURATION OF TRAINING		
	SHORT-TERM (< 3 mos)	MID-TERM (3-12 mos)	LONG-TERM (> 12 mos)
Types of Training			
Degreed Programs			X
On-the-Job Training		X	X
Specialized Courses	X	X	
Workshops/Conferences	X		
Technical Assistance	X		
Purposes of Training			
Problem Solving	X		
Upgrading Skills	X	X	
Retraining		X	X
Entry Level Staff			X

be limited to a single mode of training or they may be comprehensive and involve several or all modes of training. These may be implemented concurrently or sequentially depending on how urgently the country needs trained staff. If a reasonably experienced staff is already in place and relevant curricula exist in the colleges, on-the-job training and specialized courses are appropriate. When specific problems or issues have to be addressed quickly, technical assistance is the most expeditious training method. Workshops/conferences can be useful to create a general awareness of issues or to handle specific issues or problems requiring rapid resolution. Most lesser developed countries will have both short- and long-term needs and, therefore, comprehensive training will be necessary to resolve current problems, retrain and upgrade existing staff and to develop a human resource base to meet future needs.

These programs can be conducted in the country funding the programs or in the recipient country depending on the type of program, the level of technological development, available resources and geographic location. Most long-term and mid-term training programs will have to be carried out in the funding country, initially. The recipient countries will neither have the human nor material resources to carry out such programs. Until several key staff have been trained abroad and, with the assistance of experts from abroad, built up a proper resource base, logistical and economic considerations will limit in-country long- and mid-term training programs. This should be an objective of these programs, however, either on an in-country or regional basis. Short-term training programs that involve fewer human and material resources can be implemented within the particular country or region quite effectively. These can either be separate training functions for specific project/problem needs or part of an overall program to expedite in-country or regional training capabilities. For example, a series of workshops can be conducted to create a general awareness of particular technological issues within a country or region, to identify training needs, formulate training programs and identify appropriate trainees.

Frequently in international training activities, the selection of trainees has not been given proper consideration by the participating countries or the training organization. The countries often have no human resource development plan and are uncertain of their specific training needs. While, it is generally known that staff in certain technological areas need to be retrained or have their skills upgraded, specific fields and types of training are not known or understood. Additionally, criteria for selecting appropriate trainees are not established and trainees may be selected on the basis of their position, political ties or eagerness to visit the training country. As a result, the trainees, too frequently, do not have the proper background or experience or may be in the wrong professional position to make appropriate use of the knowledge obtained during the training program. Even when appropriate staff are selected, there is a lack of understanding of how to properly utilize the trainee and his newly acquired knowledge, when he returns home.

It is up to the training organization, and the funding agency, to make sure that appropriate trainees are selected by the participating countries. Because of political considerations, it is not always going to be possible to select the most appropriate trainees; however, early meetings between the funding agency, appropriate officials from the participating countries and staff from the training organization can minimize the number of trainees selected on political grounds. Appropriate questioning and review of documents relative to the country's current technologies, future technology plans, schedule for implementation of technology development plans, information dissemination methods and means of professional development should provide the necessary information for establishing

training objectives and selection criteria.

The selection criteria should be based on appropriate background, education, job experience, job level, language ability and health considerations. Candidate trainees should be interviewed by the training organization staff and relevant in-country officials. After discussions with these officials and a review of the interviews, the training staff and funding agency officials should review the recommended list of trainees before submittal to the participating countries. The participation of all involved parties ensures that all considerations related to trainee selection are factored in as appropriate.

Training Program Philosophy and Approach

The training program philiosophy and approach will be based on the needs of the funding agency and recipient countries, learning methods of the trainees and the know-how of the training organization. The objectives of the funding agency must be understood and a program constructed within this framework to meet the specific technological concerns of the recipient country. Typically, the funding agency wants to assist with the economic development of the recipient countries through technological advancement. At the same time it is hoped that business interests and capabilities of the funding country will be promoted. The recipient country usually wants their trainees to develop capabilities that will enable the country to achieve a degree of self-sufficiency in certain technological areas. At the same time, it is hoped they will have a pleasant experience and gain insights into the way Americans think and conduct business.

Trying to mesh these needs is difficult since it often requires the mobilization of diverse resources and developing compromises when a country's needs or interests conflict with the funding agency's program objectives. The training staff must ensure that contributors to the program fully understand the needs and stages of development of recipient countries. It is important that existing know-how be modified to fit these needs. Contributors should be familiar with the customs of the lesser developed countries and come from representative technological areas. When this is not possible, the training staff should review the lectures to recommend appropriate emphases and technology levels.

In addition, to seeing to the professional needs of the trainees, the personal needs deserve equal consideration. The effectiveness of a well orchestrated training program can be negated by a lack of involvement of the training staff in the day-to-day activities of the trainees and attention to social activities. Therefore, it is important for the training staff to design a program that imparts relevant information, while making the trainees "feel at home".

Program Implementation and Monitoring Activities

Another problem area in international training programs is the development and implementation of the program as if it were for trainees from the training country. There is usually too much information provided in too short a period of time and a lack of active participation of the trainees in the program. The information is often based on the way things are done in the training country, with little or no attempt at modification to fit the level of development or constraints of the trainees' country. Although abundant reference materials are provided, they are in such diverse forms as copies of viewgraphs, prepared paper, lecture outlines or notes, and published articles. Training manuals developed specifically for the training program are rarely provided.

Specialized training courses such as the ASEAN Coal Course present the greatest difficulty because of their shorter duration, more specific subject material and larger number of participants. Typically, such a course covers 6-12 weeks, deals with specific technologies or technology groupings and has 20-30 participants with varying backgrounds and experiences. These courses employ lectures, work sessions, discussions and site visits as learning methods. These are appropriate learning methods; however, the key to a successful training course is the integration and scheduling of these methods.

Lectures often account for a major portion of international training programs. Although this can be an effective mode of relaying information, it is basically a passive means of learning. Unless it is integrated with more active methods of learning such as solving problem cases, discussions and formal presentations, most of the information will be forgotten in a short time. Also, lectures are the most difficult for trainees from lesser developed countries to follow, because of language difficulties. Since most international training programs are conducted in the language of the industrialized countries, listening and comprehending are major problems for many of the trainees. It is essential, therefore, to provide appropriate reference materials both before and during the oral presentations. The lecturers should speak more deliberately, rely heavily on visual materials and not go into lengthy discussions of details. Because of the difficulties with comprehending spoken language and maintaining an individual's undivided attention in a passive mode, lecture periods should be limited to 50-60 minutes. It is well known that mental acuity is higher during the morning hours; therefore, passive learning methods such as lecturing should be limited to these hours. More active forms of learning are appropriate during the afternoon hours when mental acuity is lower.

Work sessions are a very effective way for applying and assimilating the information provided in lectures and reference materials, provided they are well planned and designed around

practical applications. Relevant problem cases should be developed, based on appropriate levels of technology and local customs. The participants should be divided into teams to solve these problems and to prepare oral presentations to the remainder of the course participants. The work sessions must be synchronized with appropriate lecture presentations and conducted during the afternoon hours. An expert should be available during the work session to answer questions and provide appropriate guidance. When possible, the teams should be comprised of trainees with backgrounds or experiences representative of the various technical aspects of the problem case. Also, teams can be formed on the basis of regional considerations or reformed for each new work session in order to promote interaction and exchange of information and ideas.

It is essential that the training staff ensures that information is provided to the participants in a timely and professional manner. Administrative details, such as stipends, shopping and transportation, require considerable attention, since these are very important to the trainees. Problems need professional and expeditious handling. Times should be reserved for meetings between the staff and trainees to obtain timely feedback and to demonstrate genuine concern and interest toward the trainees. Also, the structure of the course must be flexible enough to permit additional lectures, work sessions, discussion sessions or site visits of specific interest to a majority of the trainees. Occasionally a lecturer will discuss a topic of particular interest and the trainees will want additional information or exposure to the lecturer. Maintaining flexibility permits this and enhances the relevance of the training

Other specific considerations in developing and implementing and international training program are:

- Training materials should be based on practical applications to minimize trainees effort extracting relevant information.

- Appropriate reference and support materials should be provided to the trainees to ensure continuity in information flow. If possible a training manual should be developed and provided to the trainees before the training program starts.

- Lectures, practical application work sessions, discussion sessions and site visits should be utilized to present and reinforce information. An approximate split is 50, 25, 15 and 10 percent, respectively.

- Discussion sessions should also be utilized for trainee presentations relevant to country-specific programs and issues.

- The training staff should constantly monitor the trainees progress and make adjustments to the course as needed.

- Social events should be planned by the training staff and representatives from the trainees. The training staff should attend as many of the social functions as possible and the appropriate official(s) from the funding agency at least once.

- In addition to many of the above considerations, the training staff should visit the trainees once or twice to monitor the progress of on-the-job training programs and make appropriate recommendations to the sponsoring institution/organization. Frequent communication via the phone should also be part of the ongoing monitoring activities.

Evaluation and Feedback

In addition to the day-to-day monitoring and evaluation of training activities, it is important to have the participants formally evaluate the overall training program for future reference and to provide appropriate feedback to the funding agency. The form should be as objective as possible and the results discussed with the trainees both individually and as a group. Appropriate explanations should be provided by the training staff when deficiencies or suggested improvements are noted.

The results of the evaluation should be used to modify and improve future training programs. Follow-up evaluations should also be done about 12 months after the trainees have returned to their respective countries, in order to obtain more objective information on the effectiveness of the training program.

OTHER INTERNATIONAL TRAINING PROGRAMS

Selection of Trainees

This is a major problem with many international training programs, including the Nuclear Power Courses conducted at Argonne National Laboratory' Division of Educational Programs. The course participants are selected on the basis of application forms. There is no consultation with appropriate officials from the various lesser developed countries regarding the content and emphasis of each course and candidates are not interviewed prior to selection. As a result, a number of the trainees have inappropriate background or experiences, poor english comprehension or inappropriate interests. This results in frequent absenteeism and and ineffective use of training resources.

Costs and logistics are the primary reason for not interviewing candidates and meeting with appropriate country officials to ascertain training needs and appropriate emphases. Although these are valid considerations, considerable money is spent training and supporting each trainee and this money is not effectively used if inappropriate trainees are selected. It is a wise use of funds to have the trainer visit training candidates and their employers in each country or at a few appropriate regional locations to minimize this problem. Regional workshops would also be a cost effective way of establishing objectives and selecting a "pool" of trainees.

Program Content and Structure

The Electric System Expansion Planning course conducted by Argonne's Energy and Environmental Systems Division for the International Section of the Division of Educational Programs is probably the most successful Nuclear Power Project training program. The course is based on a computer program that is used study power plant options. The lectures elaborate the details, concepts and applications of the computer program and the work sessions focus on country-specific applications of the model. Data relevant to each country's situation is used to run and analyze various power plant expansion options. Since the course is focused on learning to use a specific decision-making tool, it is considered very useful and valuable by the participants and their employers. This course served as the role-model for the ASEAN Coal Course.

Unfortunately, most of the other Nuclear Power Project courses, and other training programs in general, have less well-defined objectives and do not integrate the lectures and work sessions as effectively. In fact, the work sessions are often ill-defined and simply involve more reading. The course staff rely on the lecturers to develop problem cases and this is either not done or poorly done. Consequently, the participants in these other training courses have little opportunity to apply the information from the lectures or reference materials to relevant problems. The participants often become bored and lose interest in the work sessions and course in general.

Lectures are scheduled for about 1.5 hours and often exceed this time. It is not unusual to have lectures all day for consecutive days. These lectures are often too detailed and the same basic information is presented in the different courses, only with different emphases (the Electric System Expansion Planning course is an exception to this).

The training staff decides what courses it would like to offer and, if successful at convincing the funding agency, determines the course content subject to agency approval.

The training staff for the nuclear training programs at Argonne recognize the importance social activities and attention to

the trainees personal needs. Social activities are planned with the trainees and transportation and other conveniences were made available. The staff participates in all these activities and representatives from the funding agency in many of the activities. This makes a very favorable impression on most of the trainees.

Program Evaluation

A formal evaluation is conducted by the participants in the Argonne Nuclear Power Project courses. The results are reviewed by the training and funding agency staff and discussed with the trainees. Typically, little use was made of the results of the evaluation. Because of the gratitude of the participants at having an opportunity to visit the U.S. and be exposed to an abundance of technical know-how, the formal evaluations were generally very favorable. Little in-depth informal solicitation of feedback was done by the staff. It was this type of feedback that the author found to be the most objective and useful in formulating his training philosophy and approach.

Because of costs and logistical considerations, follow-up evaluations are typically not done. This was true for the Nuclear Power Project courses. This type of evaluation will provide a much better indication of the effectiveness of the training programs. Without such evaluations it is difficult to improve the training effort.

THE ASEAN COAL TRAINING PROGRAM

Recognizing the above problems, strengths and weaknesses of other international training activities considerable attention was given to these problems in an attempt to capitalize on the strengths and minimize the weaknesses.

Selection of Trainees

The author worked closely with AID to understand its objectives. He traveled to Southeast Asia and met with local AID and government officials in order to better understand the needs and customs of the various countries. Approximately 40 candidates for the training program were interviewed for appropriateness of background, experience, job level, and interest as well as english comprehension. The trainees had to have a college degree or equivalent experience in a field of engineering, economics or an environmental discipline. They had to be employed by a company/agency directly involved in the country's coal program and have job responsibilities or potentials at the middle to senior technical manager level. English comprehension had to be good. Based on these interviews, consultation with employers, and discussions with AID, 30 candidates were selected.

The governments accepted the list of recommended trainees with only a few modifications due to last minute problems for some of the trainees. A list of selection criteria had been supplied to AID by the author and these were forwarded to the appropriate country officials. Only a few of the proposed candidates were unacceptable because of english comprehension or inappropriate background and experience.

Overall the training staff was pleased with capabilites and efforts of the trainees. They participated actively in the programs and provided valuable insights into their countries programs and specific technological problems. They also interacted and worked well with one another.

Training Program Philosophy And Approach

The basic underlying philisophy and approach of the ASEAN program was to (1) tailor the program as much as possible to the specific needs of the ASEAN region,(2) actively involve the trainees in the training process, (3) provide a broad exposure to U.S. know-how, (4) utilize lecturers from companies with experience in the region or working with lesser developed countries, (5) be sensitive to the professional and personal needs of the trainees, (6) take responsibility for development of practical application work sessions, and (7) maintain maximum flexibility in course content and scheduling.

Program Content and Structure

The program content and structure differed considerably from the author's other international training activity experiences. The content was determined more by the specific needs and requests of the participating countries and the training staff took more of a direct role in the development of work sessions and providing technical lectures. The majority of lectures were limited to the morning hours and were nominally 50 minutes long. Also, a heavy emphasis was placed on practical or "bottom line" type of information on the various technology options, since this is typically the type of information desired by trainees.

An eight week overview course covering all aspects of coal development and utilization was deemed appropriate, since (1) this was AID's first effort in coal technology training in the region, (2) most of the countries were just starting or formulating their coal development and utilization programs, and (3) there were varying needs and interests between the countries. The major emphasis was on mining, preparation, transportation and electricity generation. Coal production is low in the region, transportation systems are generally inadequate and the major use of coal will be for electricity generation. Fuel substitution, coal-derived fuels, exploration and industrial applications were of lesser interest. Within each coal technology area, technology options were reviewed from the perspective of their potential application to the ASEAN region

and major advantages and disadvantages. Roughly 65 percent of the course material was related to engineering considerations, 20 percent to economic considerations and 15 percent to environmental. Environmental aspects were addressed from an issues, standards and control perspective, since elaborate environmental assessment processes are not currently relevant.

Background and conceptual information was provided by Argonne, university or governmental agency staffs (about 30 percent of the lectures), while information on practical applications was provided by appropriate U.S. coal industry representatives (about 70 percent of the lectures). Lecturers were briefed on the course objectives and emphases and background and experiences of the trainees. They were asked to tailor their presentations accordingly and to provide advance copies of their lecture materials for early distribution.

Three Argonne technical experts assisted the author with the the course development and implementation. Dr. W. Charles Redman was responsible for the engineering aspects, Mr. Jerry L. Gillette the economic aspects and Dr. W. S. (Bill) White the environmental aspects. They worked with the author to provide appropriate lecturers and to develop the practical application work sessions.

Each work session was comprised of four different scenarios and the trainees were divided into four teams to develop solutions and to give oral presentations on their results to the other trainees. Each team had seven trainees representing different countries and different technical backgrounds. With each new work session, new team were formed to promote interactions and information exchange.

Discussion sessions were used for formal presentations by each country team on their energy development programs and for team presentations of the results of the work sessions. The training staff acted as moderators for the discussion sessions.

Site visits to mining, preparation, transportation, conversion and utilization facilities provided exposure to "real" technologies, as well as an opportunity to see other parts of the U.S.

Follow-up training programs ranging from 1-4 months were arranged for 14 of the participants based on specific interests and available funding. Participation in this type of training was was recomended and encouraged by the staff. It provides an opportunity to apply course information to ongoing work, and to learn additional information, thereby enhancing the training experience. Meetings were held with the author to determine specific interests and appropriate training organizations. The various organizations were approached and if they were agreeable training needs were outlined. Arrangements related to lodging and travel were taken care of by the training staff and the

organization sponsoring the follow-up training.

Administrative Details

A great deal of time and effort was spent by the training staff trying to make the trainees training experience rewarding and pleasant, both before and during the training program. A total of eight staff members (four full-time and 4 part-time) saw to the personal and professional needs of the trainees.

In order to ease the apprehensions of the trainees and to familiarize them with Chicago and the U.S, information was provided to the participants, prior to leaving for the U.S. and upon arrival, relevant to lodging, stipends, travel, clothing and weather. Prepaid roundtrip airplane tickets and cash advances were provided to help with travel expenses and clothing purchases. The author, also, met all the trainees at the airport and directed them to their lodging.

A handbook was prepared by the training staff providing relevant information about the U.S., the Chicago area, Argonne National Laboratory and the course. The participants were housed onsite and provided bus transportation three times a week for grocery shopping, sight seeing and shopping in Chicago. Separate transportation was provided by an onsite taxi and bus service or by the training staff on an as needed basis. Stipend checks were issued the first day of the course and midway throught the course. For the trainees participating in follow-up training, the full stipend amount was provided prior to departure. A limited check cash service was also arranged.

The course staff including two secretaries (Anita Bakke and Noreen Czyz) interacted with the trainees on a daily basis to ensure that any problems were identified in a timely manner. Meeting and luncheons were scheduled for each country team and the author. The author and the course secretaries saw to th day-to-day professional and personal needs of the trainees and the three technical expert to the lectures, lecturers, work sessions and site visits.

Each trainee was provided a desk and supplies and each work session team a work space. Mail and course materials were distributed to assigned mail boxes. A free coffee service and lounge area was provided for coffee breaks after each lecture. Refreshments were served with the coffee on specific events such as birthdays or holidays.

A relevant text, annotated course outline, weekly course schedule and bibliography was provided to each trainee and additional books were purchased on an as needed basis. Lecture materials and lecturer resumes were distributed to each trainee at least one day in advance in most cases. In addition, the training staff gave brief overview discussions at the start of each technology section to familiarize the trainees with the major

technologies and economic and environmental issues.

An average of two social functions a week were scheduled for the trainees. A welcoming buffet for the trainees, the course staff, interested Argonne Staff and other contributors to the program was held the first week, an international dinner about the middle of the course and a departing dinner the last week. Additional social events such a dinner for the trainees and the course staff in Chicago, two parties at the authors house, visits to local families and parties in the lodging international lounge were also arranged.

The author also visited the follow-up trainees at their new training location to review the progress of their programs and to provide relevant feedback to the training supervisors. Close communication was also maintained over the phone. Each follow-up trainee also prepared a report describing and evaluating their training experience for use at home and by the training staff.

PROGRAM EVALUATION

The training staff solicited feedback on the appropriateness and effectiveness of the training program both informally and formally. Major changes during the course as a result of informal feedback included eliminating one work session (on combustion), having country teams prepare country development presentations (rather than each individual discussing separate topics), increasing the amount of time spent on each work session and adding lectures. The living allowance was also increased when the trainees indicated they were having trouble meeting lodging, food and clothing expenses.

The informal feedback and formal feedback was very encouraging. The trainees believed that the staff had done a good job of tailoring the course to meet the diverse needs of the participants and providing appropriate emphases and considerable valuable information. They found the work sessions particularly useful. They were very appreciative of our attention to their personal and professional needs.

Overall

All but one person felt that the length of the course was about right. All trainees felt the course was useful; however, 16 out of the 26 trainees that filled out the evaluation form found the course very useful and the remaining 10 somewhat useful (Table 3). Indonesia felt the course was more useful than the other countries (except for the single trainee from Singapore). Some of the course participants indicated that the course would have been more appropriate if it had been divided into several shorter

TABLE 3. EVALUATION OF OVERALL USEFULNESS OF THE COAL COURSE BY THE ASEAN PARTICIPANTS.

COUNTRY	USEFULNESS		
	VERY	SOMEWHAT	MINIMAL
Indonesia	5	1	0
Malaysia	3	3	0
Philippines	4	3	0
Singapore	1	0	0
Thailand	3	3	0
TOTALS	16	10	0

courses, relevant to the interests of the different countries; however, they understood the logistical and economical difficulties in doing this. Several trainees would have preferred having the course conducted in the ASEAN region. Other relevant comments as indicated in Table 4, relate to course content and structure.

There were numerous complaints about the amount of money, the costs of lodging, the isolation of the lodging facilities and the airplane tickets. Lodging is very expensive and isolated; however, there is no reasonable alternative. The stipend was increased by another $ 200/month and frequent bus service to shopping facilities and Chicago was provided to help overcome this problem. The airplane tickets were issued improperly by Argonne's Travel Section, resulting in considerable cost increases and confusion on the part of the trainees. The author was acutely aware of the problem but received little support from the division management in dealing with this problem. The Travel Manager imposed unauthorized restrictions on the tickets, fearing the trainees might misuse them, contrary to my wishes and those of Pan Am. The problems with these tickets created considerable apprehensions among the trainees, since it resulted in delays in issuing the tickets and prevented stopovers at other U.S. cities on the way home.

Course Content and Structure

An analysis of the trainees evaluation of course content appropriateness, in Table 5, indicates that they were generally quite satisfied. Major areas for improvement centered around reducing the number of work sessions, and increasing the time devoted to each, and providing experts to lead work sessions.

TABLE 4. SUMMARY COMMENTS ON ASEAN COAL COURSE BY ASEAN COUNTRY.

INDONESIA

- Interested in briquetting and coking of peat.
- Wanted course divided into areas of interest and then conduct separate courses.
- Suggested that an expert or full time leader for work sessions.
- Expressed desire for more time on work sessions.

MALAYSIA

- Wanted more emphasis on environmental issues.
- Suggested that each lecturer be allotted more time.
- Wanted more time for work sessions.
- Suggested that an expert lead each work session.
- Requested that lecture materials be more consistent and be provided in advance of the lecture.
- Felt there was no enough free time during course.

PHILIPPINES

- Wanted more emphasis on exploration, mining, blending and transportation.
- Suggested a more independent mode of study (e.g., college).
- Indicated that work sessions should be on an as-needed basis.
- Requested that lecture material be more consistent and be provided in advance of the lecture.
- Wanted more free time during the course.
- Requested that on-the-job training be made available to all participants rather than a few from each country.

SINGAPORE

- Interested in lectures on coal trading and contracting and ash reclamation in coastal regions.
- Suggested that more time be spent on each work session and reducing the number of work sessions. Some work sessions could be combined into one.
- Suggested two week assignments with appropriate industries.

THAILAND

- Interested in metallurgical applications of coal.
- Suggested fewer work sessions with more information.
- Suggested that experts lead the work sessions.
- Wanted more free time during the last week of the course.
- Suggested that lectures be limited to the morning.

No experts were available to lead the specific work sessions, because of insufficient full-time staff; however, the training staff concurs with this recommendation.

A major area of concern expressed formally (Table 4) and informally related to the quality, continuity and availability of lecture materials. This is extremely difficult to control when using invited lectures. The only way around this problem is to have a "core staff" develop and present the major aspects or to provide a training manual which does the same. Invited lectures can then be used to elaborate on the specifics of these major aspects.

TABLE 5. EVALUATION OF COAL COURSE CONTENT BY ASEAN PARTICIPANTS

COURSE ELEMENT	CONTENT EMPHASES		
	APPROPRIATE	MORE	LESS
Lectures			
Orientation	21	3	2
Background	21	1	4
Mining	18	4	4
Transportation	19	4	3
Preparation	16	6	4
Combustion	12	7	7
Carbonization/Gasific.	17	3	6
Fuel Substitution	12	8	6
Siting	17	5	4
Electric Power Generation	14	9	3
Industrial Applications	13	7	6
Work Sessions			
Mining	20	2	4
Transportation	19	2	5
Preparation	17	3	6
Siting	19	1	6
Plant Applications	17	2	7
Discussion Sessions			
Mining in ASEAN	19	2	5
ASEAN Energy Development	21	3	2
Mining	18	4	4
Transportation	20	4	2
Preparation	18	4	4
Siting	21	0	5
Plant Applications	16	3	7

Given that most trainees are going to respond favorably to such an evaluation, it is necessary to analyse those responses that do not follow this norm. Furthermore since individual interests differed considerably it is necessary to see if these responses from the norm show any significant trends. Using this reasoning, it would appear, from Table 5, that there should have been additional emphasis on preparation, fuel substitution and electric power generation and less emphasis on background material and carbonization and gasification. Also, the emphasis on all work sessions was too great. Although the trainees found the work sessions quite useful and helpful they felt there should be fewer of them as mentioned earlier. Discussions sessions on ASEAN mining, siting and plant applications were apparently emphasized too much and those on transportation not sufficiently. The plant application discussions were conducted during the final week, when the trainees were preparing to depart and this probably accounts for the responses.

As shown in Table 6 the site visits were generally considered useful with two notable exceptions, Argonne's Corrosion Laboratory and Consolidated Coal's strip mine is Ohio. The person giving the tour of the Argonne Corrosion Laboratory was ill-prepared and quite abrupt. At the strip mine the trainees had to stay close to the bus and had a very limited view of the strip mining operation.

If such courses are offered in the future the material on electric power generation should probably be expanded, work sessions made more comprehensive and conducted by an expert and a training manual provided for continuity in emphasis and presentation of material.

TABLE 6. EVALUATION OF THE SITE VISITS BY ASEAN COAL COURSE PARTICIPANTS.

SITE VISIT	USEFULNESS CRITERIA		
	VERY	SOMEWHAT	MINIMAL
Allis-Chalmers KILn Gasifier	12	14	0
Cora Coal Handling Facility	17	9	0
Freeman United Deep Mine	18	7	1
CIPSCO Mine-Mouth Plant	15	10	1
ANL Fossil Energy Util. Lab.	9	16	0
ANL Corrosion Laboratory	8	14	4
ANL Dry Scrubber Facility	12	14	0
Lonestar Cement Plant	17	9	0
Commonwealth Edison Plants	14	12	0
Pittsburgh Energy Tech. Center	17	8	1
Consolidated Coal Tech. Center	16	9	1
Consolidated Coal Strip Mine	5	15	6
Ohio State Univ. Comb. Labs.	15	8	

COAL TRAINING MANUAL

International training programs, specifically specialized courses, often address a wide range of technologies and suitable texts typically are unavailable to provide continuity in emphases and information flow. The trainees are often given an annotated outline, various reports or publications, and prepared lecture materials. The prepared lectures may be nothing more than xerox copies of visual materials. This results in a great deal of inconsistency in the levels, emphases and type of information presented. Since the trainees often take this information home for future use it may be of limited value because of these inconsistencies. Although one can provide relevant information to the lecturers on emphasis, stage of technological development, and review lecture materials ahead of time, the practical realities are that lecturers will develop information along lines that are easiest for them. This is particularly true when costs of their time and preparation are only partially reimbursed, as is usually the case.

There are two ways to minimize this problem and increase the relevance of the lectures. The first is to maintain a "core" staff that lectures on the general aspects of the various technologies. The invited lecturers would discuss specifics in order to supplement the information provided by the core staff. This is quite costly and often not practical. The second approach is to develop a training manual that covers all the major areas from a "bottom-line" perspective. The advantages and disadvantages of the different appropriate technologies would be presented. The invited lecturers would then supplement this information with more specific details.

This second approach is recommended since it provides valuable information to the trainees, in a form easily understood and accessed. Considerable effort is involved in producing such a manual, since it should not use the classical text approach to these technologies. The manual must be developed in a manner that summarizes available technology options from the perspective of their major advantages and disadvantages. Appropriate applications and major economic and environmental considerations should also be reviewed.

A training manual was developed from the ASEAN Coal Course materials as a supplement to this report. The purpose of the manual is to provide review material for the trainees before coming to the U.S. and during the course in preparation for various lectures. It can also be used as a source of material for developing work sessions and lectures by invited lecturers. The trainees would, also, find it useful for formulating solutions to the work sessions.

This training manual can be used again, as is for a broad overview course, or specific sections can be used to design in-

depth courses on mining, preparation, transportation, etc. Used in this latter manner, the material could serve as the framework for developing a detailed training manual for specific technologies. Specific courses on economics and environmental considerations of coal development and utilization could be developed by removing these sections from each technology area and building upon this information.

RECOMMENDATIONS FOR FUTURE AID TRAINING PROGRAMS

SPECIFIC TO ASEAN COAL TRAINING ACTIVITIES

The trainees from the ASEAN Energy II Coal Training Program have had a year to utilize the information obtained during their training experience in the U.S. The first order of business should be a follow-up evaluation to obtain more objective feedback on the strengths and weaknesses of the program and recommendations regarding future training activities. It is suggested that these evaluations be done by a combination of prepared forms and personal interviews with the trainees and their supervisors. Based on the results of these evaluations and interviews, future training activities should be formulated and potential trainees identified. A regional workshop on planning and conducting training programs would help expedite in-country and/or regional training capabilities. If neither of these recommendations are feasible other recommendations are presented below.

Key ASEAN staff have now received training related to the technology choices and factors influencing the selection of a particular technology. Future courses should focus on specific technologies. Courses three to four weeks in length would be appropriate for mining and transportation in the near term and preparation, electric power generation, economic analyses and environmental assessment thereafter.

These courses should be conducted at least once in the U.S. to identify and mobilize all the appropriate resources. Some of the participants in these courses should be responsible for determining appropriate mining, transportation, etc., practices, while others would be responsible for conducting in-country or regional training programs. Subsequent offerings of these courses could be done regionally or in-country with the assistance of U.S. lecturers and trainers.

The current coal technology training manual should be used as the basis for developing more specific training manuals. These specific training manuals should devote more attention to relevant levels of technology. Future training programs would continue to rely on practical application work sessions; however, only one or two comprehensive problem cases would be necessary. Also, an appropriate solution to the problem cases should be

developed by the training staff for comparison with solutions developed by the trainees.

Follow-up training activities, of 1-2 months duration, are recommended for all trainees. These follow-up training programs should be developed during pre-training program interviews. By the time trainees start the training courses, follow-up training locations should be firm.

GENERAL

Given the continued interest in international training programs by lesser developed countries and the opportunities these provide for the countries funding such programs, it is important that AID and other agencies formulate integrated training programs that will promote their objectives, those of the recipient country, and utilize available training resources in a cost-effective manner. One step in this process would be to review ongoing, planned and proposed training activities using the form provided in Appendix A. Another step is the identification of capable training organizations that will place a high priority on professionally and competently promoting the agency's interest. A third step would be the development of relevant training materials, rather than relying on traditional materials used in international training methods.

Review of Ongoing Training Activities

International agencies generally fund a number of different training activities, either on a regional or project basis. Training programs, or elements thereof, in one region or project are often conducted without the knowledge being relayed to other regions or projects. Consequently, duplication results and there is an ineffective use of resources, experiences and funding. Additionally, one group may be responsible for a given type of training activity and another group a different type of activity within the same region or project.

Effective training programs on a regional or project basis must be comprehensive and carefully integrated for maximal effectiveness. Since most lesser developed countries are just embarking on developing human resource capabilities in various energy technologies, it is important to start at the ground floor and use the expertise of competent trainers to assist with the determination of short-, mid- and long-term training needs. Capable trainers will study the learning habits, customs and professional development systems in these countries and try to integrate these with the objectives of the funding agency, before proposing specific training programs.

A logical starting point is the organization and implementation of a series of regional workshops/conferences to:

- create an awareness of available technologies,

- select technologies appropriate to the region,

- identify training needs,

- select training methods,

- develop an integrated training program, and

- identify a "pool" of qualified trainees.

Degreed programs will be needed to retrain employed staff and develop entry level staff for future needs and for in-country curricula development. Short-term or long-term on-the-job training can be used for upgrading skills or retraining of employed staff. Specialized courses are appropriate for upgrading skills of employed staff or resolving immediate specific problems. Technical assistance is most effective for resolving specific problems is a very short period of time. Depending on the urgency of the training needs and the available pool of trainees, all types of training may conducted simultaneously (urgent scenario) or sequentially (less urgent scenario). If a ground floor approach is not appropriate, more limited types of integrated training can be developed; however, frequent interactions between the funding agency, training expert and officials from the recipient countries/regions will still be required to determine program emphases and content and select appropriate trainees.

Training programs and resources developed by one region or project should be used by other regions or projects to benefit from the "lessons learned", maximize the use of more effective training staffs and to avoid duplication of effort and expenditures.

Identification of competent training oganizations

A formal objective evaluation tool should be developed by an independent organization specializing in the evaluation of training activities. This evaluation would be given to the program participants and the results analyzed to determine the effectiveness of the various training programs. Follow-up evaluations by the trainees, 6-12 months after they are back on the job, should also be conducted. Training organizations that are parochial, paternalistic or incompetent should be eliminated. Given the intense competition from Europe and the Far East, such organization will do little to promote U.S. interests or build goodwill. This information should be made available to all agency groups funding international training programs.

Development of Training Materials

As indicated earlier in this report, training materials are often poorly prepared, inconsistent (in presentation style and emphasis), based on inappropriate technology levels or not sufficiently practical. Consequently,the trainees return home with considerable quantities of information and reference materials, but little knowledge on how to modify this to fit their particular needs. All too often this information sits on shelves, unused, because the demands on the trainees time does not permit sufficient time to assimilate and understand this information. Even when the trainee can find the time to understand and apply this information, he/she may be promoted into a position requiring a different set of information or skills. The information would then be of limited use to someone who had not participated in the training activity.

It is important, therefore, that generic and specific training manuals be developed for relevant technology areas. These manuals should provide a review of available technology (ies), emphasizing (1) appropriate technology levels, (2) major advantages and disadvantages, and (3) under what conditions the technology (ies) can be applied. A first attempt has been made to do this for Coal Technologies with the supplement to this report.

APPENDIX A

USAID Regional Bureau Coal Training
Interest and Needs Questionnaire

Background

The ASEAN Energy II Coal Training Program sponsored by the Bureau for Asia was recently developed and successfully implemented at Argonne National Laboratory under the direction of Dr. W. Kenneth Derickson. The program consisted of an eight-week (January 31 - March 25, 1983) course on the economic, environmental and technological aspects of coal development and utilization and follow-up individualized training activities for two to four months duration. The course portion of the program consisted of lectures, practical application work sessions, course participant team presentations and visits to coal development and utilization facilities. The principal purpose of the course was to provide an overview of the available technologies and their major advantages and disadvantages so that the participants could make informed decisions/recommendations regarding the appropriateness of various technologies in their particular countries.

Dr. Derickson is currently under contract to the Office of Energy to 1) document the rationale for the program he directed, 2) prepare a training manual to be used for future programs, and 3) provide recommendations regarding future coal training programs. In order to fulfill this last task in a effective manner, he has prepared the attached questionnaire to ascertain interests and needs of the USAID Regional Bureaus in current and future coal training programs. Dr. Derickson will use the responses to these questionnaires, formal and informal feedback from course participants and his own professional experience to formulate manpower development recommendations for USAID's use in formulating future coal training activities.

Dr. Derickson and the Office of Energy appreciate your effort and time in completing this form.

USAID Regional Bureau
Coal Training Activities

Regional Bureau
Respondent

1. **Ongoing, Planned and Needed Coal Training Activities.**

Please check the appropriate blanks for those topics and training activities that are ongoing (O) within your bureau, in the near-term planning (P) stages, or neither ongoing nor planned but will be needed (N)in future programs.

	Activities														
	Degreed			On-the-Job Training			Specialized Courses			Technical Assistance			Workshops		
Topics	O	P	N	O	P	N	O	P	N	O	P	N	O	P	N
Combustion															
Principles	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Systems-Power	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Systems-Non-Power	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Conversion															
Carbonization	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Gasification	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Liquefaction	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Economics															
Principles	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Engineering	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy Planning	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Topics	Activities														
	Degreed			On-the-Job Training			Specialized Courses			Technical Assistance			Workshops		
	O	P	N	O	P	N	O	P	N	O	P	N	O	P	N
Engineering															
Chemical	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Electrical	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mechanical	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Structural	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Environmental															
Principles	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Biological	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Engineering	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Social/Cultural	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Exploration	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mining	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Preparation/Storage	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Siting	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Transportation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Training Trainers	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other															
_____ _____	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
_____	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
_____	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Funding Priority and Effectiveness of Training Activities.

Please rank each of the activities in terms of current funding priorities and perceived erall training effectiveness.

Funding Priority

tivity	(High) 1	2	3	4	(Low) 5
)egrees					
)n-the-Job-Training	—	—	—	—	—
pecialized Courses	—	—	—	—	—
echnical Assistance	—	—	—	—	—
/orkshops	—	—	—	—	—
	—	—	—	—	—

Effectiveness

ivity	(Maximal) 1	2	3	4	(Minimal) 5
egrees					
n-the-Job-Training	—	—	—	—	—
pecialized Courses	—	—	—	—	—
echnical Assistance	—	—	—	—	—
orkshops	—	—	—	—	—
	—	—	—	—	—

3. **Duration of Training Activities.**

Please indicate the average duration of the different training activities sponsored by your bureau.

Activity	Duration			
Degrees (Years)	__(1-2)	__(3-4)	__(5-6)	__(7-8)
On-the-Job Training (Months)	__(1-3)	__(4-6)	__(7-12)	__(13-24)
Specialized Courses (Weeks)	__(1-2)	__(3-6)	__(7-10)	__(11-15)
Technical Assistance (Months)	__(less than 1)	__(1-2)	__(3-4)	__(5-6)
Workshops (Days)	__(1-2)	__(3-5)	__(5-10)	__(11-15)

4. **Comments:**