XD-AAA-903-A

AN EVALUATION OF THE CONVENTIONAL ENERGY TRAINING PROGRAM

AND

THE ENERGY TRAINING PROGRAM

January 12, 1990

Office of Energy

IQC: PDCX-5730-I-00-6111: D.O. #3

U. S. Agency for International Development

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ACKNOWLEDGEMENTS

The DSI team greatly appreciates the assistance and support from USAID mission staff in the Philippines, Thailand, India, Pakistan, Egypt, Kenya, Tanzania, Zimbabwe, Costa Rica, the Dominican Republic, Jamaica, and Ecuador.

These individuals who are responsible for continuing the Energy Training Program also increased the team's efficiency in conducting this evaluation.

In addition, Washington-based personnel from USAID, the Institute for International Education, and The World Bank have provided suggestions and data which have contributed to the production of this report.

The team specifically wishes to thank our USAID project manager, Shirley A. Toth, who has provided essential technical direction and administrative support for the successful completion of this delivery order. Her assistance is greatly appreciated.

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AN EVALUATION OF THE CONVENTIONAL ENERGY TRAINING PROGRAM AND THE ENERGY TRAINING PROGRAM

Executive Summary

The completed Conventional Energy Training Program and the ongoing Energy Training Program began in 1981 by providing M.S. degrees, in-service programs, and industry fellowships in science and engineering fields "to increase the technical competence in developing countries to explore for and exploit conventional energy resources."

Today, the Energy Training Program offers a variety of non-academic and academic energy specialties to trainees from Ministries, government-owned companies, and private sector employers. In August 1989 Development Sciences Inc. (DSI) was asked to conduct an evaluation of selected activities within these two programs.

DSI's evaluation focussed on the impact these two training programs have had on their participants, their institutions, and their countries. The results show success on all three dimensions.

During the period of August - December 1989, DSI interviewed 112 participants of the 929 total participants from the two programs. Employing an interview questionnaire to develop the data base, DSI measured the program's success with the use of dBase III+. In addition, over 75 trainee supervisors and other energy personnel were questioned informally on their opinions and suggestions regarding the program's impact and future.

Along with the programs' success came many suggestions on the need for changes in order to implement the training courses. Both participants and other energy personnel identify management training as a requirement to lessen barriers to change.

The report includes eight chapters covering the project's objectives, its data base, methods and approach, measurement of success, participant responses with their suggestions for change, other training program issues, specific illustrations, and conclusions and recommendations.

This evaluation strongly supports the concept of an expanded energy training program with new courses on energy management, environmental impacts of energy, and indigenous energy sources. Additionally, there is an opportunity to augment training with an active alumni program which recruits new trainees and continues a US role in technical assistance and international trade.

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CHAPTER ONE. OBJECTIVES OF THE EVALUATION

This Delivery Order includes the request for an evaluation of "selected activities within the completed Conventional Energy Training Project (CETP) and within the ongoing Energy Training Project (ETP)".

In 1980 and 1981, the initial market assessment of training opportunities in conventional energy for the USAID Energy Office was completed by DSI. At that time 20 countries in the Near East, Africa, Asia, and Latin America were visited to identify:

- o Major conventional energy resources in various stages of development,
- o Key government agencies and individuals associated with their utilization and development, and
- o The level of interest in participation in US Masters' degree programs.

Subsequently, a compilation of US university programs including science and engineering curricula relating to energy resource development was prepared.

In the summer of 1989, DSI was asked to return to the project and determine how the CETP and ETP participants have utilized their training; and the impact, if any, of their training on their countries' energy situation. This report specifically addresses the following issues:

- o The appropriateness of selected candidates,
- o The effectiveness of individual training,
- o The applicability of subsequent job placement, and
- o A preliminary judgment of the long-term effect of this training on the management of energy institutions in these countries.

First of all, following the contract scope of work, DSI evaluated the individuals: did they have appropriate backgrounds to benefit from the training and did they derive benefits such as more responsibility or promotions from the training. Were they introduced to US private industry?

Secondly, DSI prepared questions on their organizations: were there downstream effects and how did these organizations react to this training?

Thirdly, DSI used a wide angle lens on the countries to determine which ones generally benefited the most, and did mission-funded energy projects help in those particular countries

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with active AID energy programs.

This evaluation is different from the two previous review studies; the first made in 1983 by an USAID energy team which evaluated the Conventional Energy Training Program (CETP), and the second in 1985 by International Science and Technology Institute, Inc. which was a participant follow-up study for the CETP.

This report is restricted to the above selected issues and, therefore, does not follow the USAID format for project evaluation. It should also be noted that this is not an evaluation of the Institute of International Education (IIE) and their performance in carrying out the two projects.

What the evaluation does accomplish is to measure the impact on the participants. And then, through their responses, permit DSI to formulate some conclusions to the above issues. Additionally, it includes recommendations for ongoing program changes and for future program initiatives.

CHAPTER TWO. THE DATA BASE

Twelve countries were initially chosen as most significant to measure the training's impact. With the assistance of the USAID Energy office and IIE, the decisions were based on which countries were previously visited, the numbers of participants in major cities, the diversity of training courses taken, and relevant airline schedules.

The final twelve countries included the Philippines, Thailand, India, Pakistan, Egypt, Kenya, Tanzania, Zimbabwe, Costa Rica, the Dominican Republic, Jamaica, and Ecuador. Zimbabwe was chosen to replace Ghana after the local mission in Accra refused the evaluation visit. Zimbabwe offered an opportunity for program expansion as it has not been a CETP or ETP participating country and its mission in Harare was agreeable to a visit.

Within these eleven participating countries, 112 former trainees were contacted and interviewed. They form the basis of the evaluation. Additionally, almost 100 other individuals who are USAID mission project, energy and training personnel; interviewee supervisors; managers and training officers of relevant energy-related government and parastatal agencies; and private sector representatives participated in meetings on the energy training programs.

These additional meetings helped to provide information on the institutional and country training impacts as well as to offer suggestions for future changes.

CETP/ETP Interviewee Profile

The 112 former participants are tabulated in Figure 1, "Profile of CETP/ETP Interviewees" by their respective courses. Their course distribution is shown as follows.

1: 24 completed TVA1, "Utility and Industry Energy Conservation",
2: 9 took TVA2, "Electric Utility Engineering",
3: 9 attended the Arthur D. Little "Petroleum Management Program",
4: 9 participated in UPA1, the "Energy Planning and Policy" course at the University of Pennsylvania,
5: 14 completed the "Applied Petroleum Exploration and Production Technology" course with Professional Training Resources International,
6: 13 participated in either the Westinghouse Advanced School in "Power Systems Engineering" or the General Electric Systems Engineering" Course,
7: 4 attended "Managing a National Petroleum Enterprise" given by Oil and Gas Consultants International, Inc.,
8: 6 attended ASEAN specific courses in either energy

Figure 1

PROFILE OF CETP/ETP INTERVIEWEES

Code Course	1 TVA1	2 TVA2	3 ADL	4 UPA1	5 PTRI/ IPCS	6 West/ GE	7 OGCI	8 ASEAN	9 Univ.	0 Other	TOTAL
Near East and African Regions											
Egypt	4	3			4		1				12
Kenya	2		2	2	1				4		11
Tanzania	1			3	2	1			2		9
Zimbabwe											
											32
Asian Region											
India	1			1		1			2		5
Thailand	1	2	2	1		4	1	2			13
Pakistan			3		4	2			4		13
Philippines	7	1		2		2		2			14
											45
Latin American and Caribbean Region											
Costa Rica	2	5	2		3			1	2	2	17
Dom. Rep.	1								4		5
Ecuador	2						2	1			5
Jamaica	3					3					6
											33

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planning or coal technology,
9: 18 completed masters' degree programs, and
0: 2 participated in specifically designed internship or other training programs.

To summarize the courses taken by these 112 interviewees: the largest group of 24 completed TVA1, the energy conservation course; the second largest group of 18 completed masters' degree programs, and the third largest group of 14 attended the petroleum technology courses.

CETP/ETP Total Participant Profile

These 112 interviewees can also be compared with the total CETP/ETP participants who numbered 929 at the start of the evaluation. When one looks at the worldwide scan of energy trainees as shown in Figure 2, "Profile of CETP/ETP Participants" one notices a similar distribution among the ten course categories. In both groups, the largest numbers of participants are in the energy conservation, petroleum technology, and university masters' degree programs.

Almost 20% of all the participants completed the energy conservation course, 16% attended the petroleum technology courses, and 14% completed masters' degrees.

There are differences in courses among the regions: 22% of the total participants from Africa completed university masters' degrees, 17% from Asia took energy conservation, 32% from Latin America and the Caribbean completed energy conservation, and 29% from the Near East took petroleum technology.

Twenty two African countries have sent trainees to the US with five countries contributing more than ten each: Ghana, Kenya, Liberia, Sudan, and Tanzania. Many of the remaining African countries are French-speaking with limited candidates for a US based program.

Thirteen Asian countries have either sent trainees to the US or participated in specific ASEAN energy planning and coal technology courses. Nine of the thirteen countries have sent over ten trainees each: Bangladesh, Burma, India, Indonesia, Malaysia, Nepal, Pakistan, Philippines, and Thailand.

Sixteen Latin American and Caribbean countries have participated in either the US program or the Guatemalan electric power course. Costa Rica, Ecuador, Guatemala, Haiti, and Jamaica have had ten or more trainees. Most of the remaining countries are Spanish-speaking with limited candidates for a US based program.

Eight Near Eastern countries have participated in the US program with five sending ten or more. These five are Egypt, Jordan, Morocco, Tunisia, and Yemen.

Figure 2

PROFILE OF CETP/ETP PARTICIPANTS

Code Course	1 TVA1	2 TVA2	3 ADL	4 UPA1	5 PTRI/ IPCS	6 West/ GE	7 OGCI	8 ASEAN	9 Univ.	0 Other	TOTAL
Africa											
Botswana	1										1
Burundi				2	1		1				4
Cameroon					4						4
Djibouti				2							2
Ghana	6	5	1	6	5	2	1				26
Ivory Coast					2	1					3
Kenya	15		2	2	2				9	1	31
Lesotho		2									2
Liberia	6	3	3	2	6	2			5	2	29
Mali			1		2		1				4
Mauritania						1					1
Niger										1	1
Nigeria					1						1
Rwanda	1										1
Senegal										1	1
Seychelles					1					2	3
Sierra Leone	1								1		2
Somalia				1					2		3
Sudan	5	1	2	2	15	3			16	6	50
Tanzania	4	1	1	3	4	2			10		25
Togo	1	1									2
Uganda				2							2
											200
Asia											
Bangladesh		1	3		2				4	8	18
Burma	4	5	6	5	7	4	4		2	3	40
Fiji				1							1
India	9	5	10	2	6	4	3		13	4	56
Indonesia	8	2	1	5	6	2	3	14	2		43
Malaysia								15			15
Nepal	8	7	1	4	3	9	2		6	4	44
Pakistan	4		4	1	9	6			6	13	43
Philippines	23	4	2	10	5	3		16	2	5	70
Singapore								1			1
Sri Lanka	4	1								2	7
Thailand	6	7	7	2	5	8	2	14	7	2	60
Tonga				2							2
											400

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PROFILE OF CETP/ETP PARTICIPANTS, con't.

Code Course	1 TVA1	2 TVA2	3 ADL	4 UPA1	5 PTRI/ IPCS	6 West/ GE	7 OGCI	8 ASEAN	9 Univ.	0 Other	TOTAL
Latin America and Caribbean											
Barbados	3			1	1				2		7
Bolivia		2				2	1				5
Colombia				1							1
Costa Rica	8	4	2		7	2	1		4	6	32
Dom. Rep.	3								4	2	9
Ecuador	4				2	1	2		2		11
El Salvador	1										1
Guatemala	2		1							20	23
Guyana	3										3
Haiti				5					2	3	10
Honduras	1	1		2		1	1		1		9
Jamaica	12	1				3					16
Mexico	2										2
Panama	1								1		2
Peru	2	1		2	1	1	1			1	9
Uruguay	3										3
											143
Near East											
Egypt	15	6	1	4	25	1	3		9	30	93
Jordan	2	3		5	2	6	3				21
Morocco	1		3	1	9		2		4	2	23
Oman							1				1
Portugal	4	3									7
Tunisia	3				7				16	1	27
Turkey					2						2
Yemen		1			10		1				12
											186

In the overall participant profile, the largest number of trainees come from Egypt with 93, the Philippines is second with 70, and Thailand is third with 60. Additionally, it is interesting to note that on a per capita basis, Costa Rica leads with 32 trainees. Kenya has the largest number of private sector trainees with 12 of the 15 energy conservation participants from major private industries. It should be added that some trainees completed two courses and may be counted twice in the overall profile. Also, some interviewees have recently returned from courses and were not in the overall participant profile.

When there was an opportunity and time to make a choice of which trainee to interview, preference was given to matching the total participant profile. In many countries, however, time did not permit a choice and trainee availability was the determinant.

How Representative is the Interviewee Profile?

As previously mentioned, both profiles show the largest number of participants in the energy conservation course, and follow up with petroleum technology and university training. There is some variation, however, between petroleum technology and university training participants by region.

Comparing the two profiles in Figure 3, "A Comparison of Interviewee Profile with Participant Profile" shows the variation in percentages interviewed. The Latin American and Caribbean Region is over represented because it is easier to interview with smaller geographical areas and smaller numbers of participants. In the Dominican Republic and Costa Rica it was possible to interview over half of all the participants, whereas in the larger countries with more participants, smaller percentages were interviewed.

Also, those countries with participants in more than one population or industrial center required additional travel time which was not readily available.

Assistance from the local missions was very important. In several cases the large numbers of interviewees was due to mission staff assistance in setting appointments in advance.

To conclude, 12% of the total participants were interviewed. The largest percentage interviewed came from the Latin American and Caribbean region. Also, the interviewee profile contains similar numbers of trainees in the ten categories of courses to the total numbers of trainees in these courses. The interviewed participants approximately represent the total number of participants.

Figure 3

COMPARISON OF INTERVIEW PROFILE WITH PARTICIPANT PROFILE

	Number of Interviews	Number of Participants	Percent of Total
Near East Region	12	186	7
Egypt	12	93	13
African Region	20	200	10
Kenya	11	31	36
Tanzania	9	25	36
Zimbabwe			
Asian Region	45	400	11
India	5	56	9
Thailand	13	60	22
Pakistan	13	43	30
Philippines	14	70	20
Lat Am/Carib Region	33	143	23
Costa Rica	17	32	53
Dominican Republic	5	9	56
Ecuador	5	11	46
Jamaica	6	16	38

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CHAPTER THREE. METHODS AND APPROACH

As indicated in the previous chapter, personal interviews were conducted with 112 participants in the Conventional Energy Training and Energy Training Programs. In order to assure reliable and comparable results among the different countries, systematic procedures had to be employed. These precautions avoid random error, render the findings more reliable, and advise the reader about the limits of generalization.

The interviews took place mainly in the workplaces of the participants in the 11 countries from August to December, 1989. Large concentrations of participants were given priority so that urban areas were well represented. There was some inevitable self selection by participants because they were not required to be interviewed. Also, a few professionally mobile participants who left no job trail were not found in time, although several others were interviewed at the place of their new employment in either the public or private sector.

Since only 112 participants were interviewed out of a possible 929, generalization should be made with appropriate caution. There was no conscious bias introduced aside from those implicit in the criteria for country selection. The authors doubt that adding an additional 100 participants from a similar mix of countries would substantially change the general findings.

A common interview form was employed in all countries. The interview instrument was designed in the field to satisfy the information requirements of the Scope of Work. It was tested in two countries before the design was stabilized. Minor adjustments were made to cope with the variety of responses as interviewing proceeded, but the basic instrument was employed in each case.

Since a frank interview process is not common in some countries and since both politeness and gratitude for training interject a bias away from negative criticism, the interviewers took precautions to relax the interviewee and create an open atmosphere for communication. Furthermore, the interview was designed to test for and overcome inhibitions by varying the form of questions, especially when dealing with desired changes in the training program and barriers to institutional change.

A variety of questions with similar intent was used, but referring to different time frames, subjects other than the respondent, and different training scenarios. These devices offer a check for consistency of response and informed the interviewer of possible manipulation of the situation by the interviewee. Judging from the number of suggestions made and the consistency of each respondent in vastly different cultures, these techniques succeeded in encouraged criticism and comments of all types.

The content of the interviews (See Exhibit A) focussed primarily on the impact of training: on the individual, on the institution of employment, and on the country. Within this framework, ideas were solicited for improving performance and encouraging implementation through enhancing the relevance of course content.

Interviews varied in their duration, even though the same basic questions were asked. The average interview lasted for slightly more than one hour, but some highly verbal respondents' interviews exceeded two hours. A few interviews were shortened by eliminating some questions to accommodate busy schedules. With some exceptions, interviews were conducted in private on a one to one basis.

Only two interviewers administered and coded the interviews, so consistency of measurement was assured. The data base of these coded responses was analyzed with dBAse III+ to facilitate reporting of the distribution of responses. Most data analyzed included the entire list of respondents. On occasion, sub-groups were reported when their size permitted reliable interpretation.

Employing the methods outlined, the data reported in this section are empirically derived from 112 interviews conducted in the last half of 1989. All interviewees were not asked all 42 prepared questions. (See Exhibit A for a list of questions and the responses they elicited.) Redundancy was introduced in the list of questions as a consistency check to correct for responses that were well intentioned, but misleading, because of the respondents' desire to be polite.

Interviewers were free to eliminate redundancy among the questions when not needed, accounting for a lower total number of questions in some interviews. Also, some questions were eliminated when the interview situation required abbreviation. Thus, when a distribution of responses to a question is reported, the number of people responding as characterized by the paraphrasing is reported. That number is immediately followed by the total number of people actually asked that specific question when fewer than the full 112 respondents.

The questions range through a number of subjects, their purpose is to indicate the respondents' points of view on the value of their training. In particular, the interviewers wanted to know the impact of training on the individual, his or her institution, and on the nation. There were also questions on the training itself, quite apart from its impact.

Although they are not included in the next two statistical chapters; many supervisors of the participants, training officials, and other relevant professionals were also asked about a range of training issues, including a check on the judgments given by the participants. The opinions of these approximately 100 additional personnel are reported when relevant to the

discussion. In addition Chapter Six, "The Time for Change" summarizes these suggestions.

The conclusion has already been reported that the training was highly successful in the eyes of the trainees and their supervisors. We now discuss the details of that assessment and the many dimensions on which success or failure is quantitatively measured.

The Participants Say "YES"

There are four dimensions on which success is measured: personal, institutional, national, and for the job goals of the training itself.

The analysts created four basic indicators of success by combining responses to those questions designed to identify the impacts of training. (For more detail see questions 2, 3, 4, 5, 15, 16, and 34 in Exhibit A.) The responses paraphrased below and the large numerical count suggest a positive self evaluation by the participants; a positive impact on the institution of employment; a perception of benefits to the nation; and the relevance of training to the job, both upon immediate return to the country and after some time had elapsed.

There have been positive impacts on:

1. The Participant --- "Improved sense of ability to handle the job, more confidence, better relations with peers ..."
(95 participants of 104 asked)

The Participants' Job Status --- "More money, responsibility, promotion, fulfilled expectations ..."
(79 participants of 104 asked)

2. The Institution --- "Raised consciousness; supported group objectives; improved practices, investments, savings; implemented programs ..."
(93 participants of 107 asked)

Communications within the Institution --- "Communicated on the job, held seminars, delivered papers, designed analytical forms, shared training documents, employed multiple media of communications ..."
(93 participants of 107 asked)

3. The Nation --- "Builds indigenous expertise, allocates and uses resources more efficiently, reduces debt, increases trade, facilitates relations with foreigners ..."
(93 participants of 99 asked)

4. The Relevance of the Training Just After Return --- "It's essential, could not do job without it; very helpful; most training helpful, some not relevant ..."
(94 participants of 107 asked)

The Relevance of the Training On Current Job --- "Essential, could not do job without training; necessary to move from old job to new one; a stepping stone ..."
(90 participants of 108 asked)

The positive impacts paraphrased from the participants' responses indicates that the training efforts have been rewarded in personal growth, institutional development, national benefits, and long term job relevance of the training materials received. Furthermore, for 55 of the participants or about one-half, the responses to all four indicators together were positive, indicating a significant group of active communicators now reaching a much larger audience than just those participants trained directly.

Another indicator of success is the absence of a significant group of negative evaluations. On the four questions reported above, only 9 people could be found who were negative on their experience. Of these 9 people reporting a failure of the training to deliver desired results, the sentiments were not even consistently negative across all 4 indicators of impact. More negative responses will be reported in the next section, but the net evaluation by the participants is highly positive. Even correcting for the natural politeness associated with the gratitude one feels for being sent abroad, the program has had a significant and pervasive positive impact.

The participants also perceived benefits for the U.S. Of the 80 people asked about benefits for the U.S. from the training, 32 thought that there were economic trade benefits in the sale of equipment or through the ease of negotiating agreements with Americans. Another 39 thought the exposure helped Americans overcome cultural misconceptions in dealing with them.

This generally highly positive report on the findings of the participants does not tell the entire story. There are limits on the positive impact of training worthy of further evaluation.

The Barriers to Change

There are limits, sometimes grave limits, to the positive impact of training as evaluated by the participants. As the interviewers probed for indications of problems, serious limits on the impact of training were readily identified. The impact of training is attenuated by barriers to change found in the trainees' institutions. While 48 participants said that their institutions provided no barriers to the changes they recommended from their training, 43 could readily identify sources of problems.

The most frequent reason for not accomplishing their new objectives, according to 24 participants, is that their management resists new behavior. Other more specific reasons given by 19 additional respondents fall into a similar pattern of management resistance:

- "Studies will be authorized, but there will be no

implementation of findings ..."

- o "Ignorance ..."
- o "Personnel rotation policies that transfer people away from their expertise ..." or
- o "Confusion of responsibilities ..."

Thus, according to the participants, the fruits of their training are spoiled by management's inhibitions to change.

To test whether this blaming of management was simply an excuse for lack of funds, foreign exchange or otherwise, 94 participants were asked about financial limitations as a barrier to change. Fifty four (54) said that funds were not a barrier to change. Some respondents noted that the money for change is spent anyway on waste, replacing equipment, breakdowns, etc. Only 37 respondents thought that lack of funds was a barrier to change.

When asked to suggest means to surmount the barriers, the answers of the 48 participants out of the 56 who had suggestions were scattered among several possibilities. The largest single group of 24, however, returned to the theme of management. They wanted USAID to provide management training for themselves and for their managers as well.

In Chapter Six, "The Time for Change", the discussion of these matters turns to sources of information other than the statistics of the participants. For the participants, however, the message is clear. For about one half of the group interviewed, the impact of the knowledge gained in their training was frustrated by institutional forces, primarily resistance from management.

The participants have a warning for program designers. Training is a necessary, but not sufficient condition for economic development. Knowledge, no matter how successfully transmitted, is only one part of implementation toward the realization of development goals.

CHAPTER FIVE. THE CHANGES PARTICIPANTS DESIRE: SOME LIMITED GUIDANCE FOR THE FUTURE

The issue of changes desired in the program was approached from a number of different perspectives in order to relieve the respondent of cultural inhibitions against criticizing one's host. No fewer than 14 questions were asked which invited participants to share their thoughts about desired changes. (For more detail, see questions 17, 18, 22, 23, 24, 29-33, 35, 36, 39, and 40 in Exhibit A.)

When asked directly what changes in course content might be desired, 27 of the 101 that were asked the question said they were generally satisfied. Alternately, 43 could think of more specialized content that would be preferable. A broad range of scattered suggestions has been made by that group. Another group of 28 wanted more hands-on experience relative to classroom instruction, rather than changes in course content.

When directly requested to enumerate changes in the infrastructure of the program that might be desired, 25 of the 64 asked the question were generally satisfied. Thirty seven (37) could cite some problem. Twenty eight (28) of those respondents cited personal arrangements such as housing or the insufficiency of the stipend.

Other questions explored the issue of change from different perspectives such as the perceived limit to the usefulness of training. The greatest number, 59 of 92 asked the question, could not define limits. Some respondents, 8 in number, chose to define the limits in the existential circumstances of the participant; his/her status or attitude, not in the training itself. That left only 19 participants who contributed the thought that the training was not specialized enough.

When asked what changes would be needed so that more people could benefit from the training, the core of satisfied people who did not suggest changes remained nearly one-third, 29 of 95. Twenty three (23) desired specific course content changes of various types that are diffused among several preferences. The consistent core of 19 respondents seek more on-the-job experience. The remaining respondents scattered their remarks over debates about longer or shorter courses. There is no clear winner to guide the curriculum designer in these clusters of responses. The most repeated responses were either "leave the courses alone" or "provide more on-the-job experience".

Another question approached the issue of change from a different direction. An important measure of satisfaction is whether or not participants want to go again. The answer is a resounding "yes" by 89 of 92 asked. This time, however, they would want more specialized and advanced courses, as is appropriate to people already trained. They were divided on whether they would prefer academic degrees or short courses the

second time around.

This same division was repeated in a direct question about whether future training should be applied technical training or academic training. The largest group, 47 of 84 said that applied training was preferred. A significant minority, 25, clearly wanted academic training and 10 more felt that a mix of both should be provided.

Once again, to invite comments, the issue of change in the program was approached from a different angle. When asked for the most useful experience in the U.S., 42 of 95 cited some direct on-the-job or plant visit exposing them to technologies and specific locations. For others, 36 participants, the exposure to American society and its openness, became their most useful experience. This response reinforces the desirability of the hands-on experience that quite a few of the participants expressed.

If the diffused messages about changes in training are summarized, there was a group of about one third that made no suggestions for change. The largest group, however, suggested changes for the future. There was a group expressing a desire for more specialized courses. There were significant minorities evident in the interest for more direct on-the-job and hands-on training. Finally, there was widespread desire for management training in these statistics, and even more in the volunteered responses to other questions over the course of interviews.

Indeed, management training is not only preferred by the participants, but they also think their superiors should be trained. Sixty eight (68) out of the 71 asked thought that management training for their own management would be highly desirable.

The issue of future directions for training is not fully resolved in the statistical data reported here. That is not surprising in that each course contained participants with a wide variety of backgrounds in age, preparation, and interests. Indeed some people complained that the pace was too intense and others said it was too elementary. The interest in more specialized courses is probably symptomatic of the diversity among trainees.

This issue of diversity among participants has a good and a bad side. On one hand, there was praise for the diversity in terms of ethnic and national variety bringing interest to the program. On the other hand, diversity of age and technical background was the source of a number of concerns. There were people clearly out of their level in a number of courses which led to too advanced or too basic discussions in the classroom. The larger issue is whether or not the participants were well suited to their training or mismatched to their educational requirements.

This mismatching problem was investigated more systematically in the interviews by questions which first asked if a mismatch had occurred, and then, if it had negative consequences. On the first question, did mismatches between courses and job background occur, the answers show that they occurred 22 times among the participants.

The reasons given were as follows for 14 participants:

- o There was a reorganization of their institution which altered the trainee assignment,
- o They were assigned to a new post upon their return, or
- o The project for which they were trained did not materialize.

For the remaining 8 participants, the reasons were as follows:

- o The selection of course was incorrect due to faulty or late information,
- o The U. S. on-the-job site did not really parallel the home experience, or
- o The country selection process used irrelevant criteria.

Most of the mismatches occurred after the participant returned home. Only 8 might have been preventable by the training program. The interviewer's impression was that the people were themselves very capable and the participants were suitable for the training they received and vice versa.

Indeed the interviewers followed up on the mismatches and found that of the 22 mismatches, only 2 were serious problems. The others had the following results:

- o Six were promoted to an even more impactful job,
- o Three had supervisors who made a conscious effort to broaden the trainee outside of his/her immediate field, and
- o Nine had only a temporary dislocation with consequences which were not negative for the individual and were positive for the institution.

The net judgment of the interviewers is that generally, courses and participants are appropriate to each other. Where the mismatches occur, they are mostly the fault of a selection process that is long and cumbersome, leaving too little time at the end to correct some of the mistakes. For this goal, changes should be made in the selection process.

The judgment of a majority of the participants was that change in the selection process was not necessary to bring the correct candidates forward. Fifty (50) of 83 asked were satisfied, even though the warning time was not sufficient. Of the remaining 33 people, 10 thought the process was too political, 7 believed it too bureaucratic, 4 considered it too poorly screened, and 12 felt it in some way too mysterious.

Perhaps the final examination of changes for the future in which the participants can contribute is in the area of regional training. Testing the response to moving courses from the U.S. into the field met with varied answers.

The dominant theme when combining questions and countries was not to move from the U.S. Of the 88 people asked to respond; 32 saw no advantage to teaching in the region, while 28 thought it would be positive to work in a familiar resource base. There is no clear message here.

When the interviewers probed deeper to understand the losses that would be suffered by moving from the U.S., 44 of 80 said the training requirements would not be available in the region and global contact would be missed by 19. In sum, 63 of 80 did not want to give up their U.S. experience.

Partisans of regional training tended to come from areas where oil or coal or other physical resource structures made similar regional conditions more interesting. Some people qualified their willingness to be trained in the region, if it were limited to narrow technical or theoretical learning for which site visits would not be required.

Most others were very much against losing technical and cultural contact with the U.S., even under interviewer stimulus. Of course, there is a bias introduced in this response pattern because all of the participants were English-speaking. The pro-regional respondents, for linguistic reasons, were no doubt under-represented.

In the regional story and in the domestic evaluation of changes needed, there is a sense that the training program of the past served participants well. Short of custom courses which are probably prohibitively expensive, or expansion of on-the-job assignments desired by the participants, a good balance appears to have been struck. The program cannot remain static, however, because the past is not entirely a prelude to the future. From other sources of information comes a story that will not let curriculum designers rest.

CHAPTER SIX. THE TIME FOR CHANGE

The Conventional Energy Training Program (CETP) began in 1981 with US university masters' degree programs. As traditional academic courses proved to be inappropriate for many energy professionals from developing countries, nonacademic training was added. Specific programs with existing Training Institutes and newly developed Special Courses and Industry Internships have now been introduced to the Energy Training Program (ETP).

The previous chapter has included some suggestions for change based on questionnaire responses from the interviewed participants. These suggestions focus on the issues of changes in the course content and changes in the course locations. In addition to the interview process, meetings with trainee supervisors, managing directors and training officers of energy-related agencies and parastatals, and private sector personnel provided additional suggestions for potential changes.

These meetings were organized primarily to amplify our knowledge of the ongoing program's impacts on the trainees, their institutions and their countries. However, when time permitted, additional questions on possible changes were added. Generally, the line of questioning was not structured and permitted a wider variety of topics to be covered. No attempt to statistically analyze these meetings has been undertaken, but meeting notes have been reviewed.

Relevance to the 90's: The Environment and Indigenous Resources

The decade of the 80's with problems of nuclear accidents, oil spills, greenhouse gases, hurricane damage, loss of tropical forests, and regional droughts has brought worldwide attention to global environmental issues. Many of these issues have appeared in discussions on topics for new ETP courses.

The Director of Energy Development for the National Institute of Energy in Ecuador (INE) expressed the need for environmental impact training in hydroelectric projects.

Environmental concerns related to energy in the developing countries visited most frequently included the need for training to understand and properly control:

- Deforestation problems resulting from expanding fuelwood use,
- Coal mining and coal use, and
- Urban trash management.

National environmental interest tends to encourage national energy resource use. Many of these countries also wish more control over their domestic energy sectors in the future; they want to stress the use of indigenous resources to their maximum.

The President's Office in Kenya which approves all training for civil service personnel suggests that their first priority for energy training should change from oil exploration to fuelwood and solar energy.

Especially when local drilling for oil has not identified local reserves, they wish to focus more on developing their other indigenous resources. These include more efficient use of wood and charcoal, small hydro, agricultural residues such as sugar-cane bagasse, coal and gas development, and solar thermal water heating.

They request new "renewable" courses which focus on how to evaluate their total indigenous fuels and then make decisions on which ones to use and with which technologies. They prefer that courses include technologies which they can anticipate producing themselves in the future.

Strong interest in coal and gas development training was expressed in several countries. A coal development course can be organized for countries already using coal, but requiring assistance in modernization and rehabilitation.

The Assistant Director of the Confederation of Zimbabwe Industries believes that the local coal industry can be greatly assisted by US technical and management training for both new employees and top management.

Also, a coal development course can assist a country new to the use of coal, but planning future coal importation.

The Deputy Chairman of the Egyptian Electricity Authority believes that coal training should include all aspects from writing coal contracts to handling coal.

Similarly, many countries are now considering gas turbines to meet peak electric loads and wish training on either domestic gas development or importation. They request technical and financial programs including "how to price gas" and "how to run a

national company" type courses.

The Senior Executive Engineer for Gas Development in the Tanzanian Ministry of Energy notes that a gas development course could include training on project definition, reservoir economics, and pricing issues and be designed for geologists, engineers. economists, and financial analysts.

The major environmental issues of the last decade bring about an opportunity in the 90's to offer new courses on environmental impacts of energy development and indigenous energy development.

Financing of Energy Projects

Finally the 90's bring about increasing concern over the financing of new energy projects. This shows up with the continuing interest in energy conservation programs and the new interest in private financing of energy projects.

Many engineers trained by CETP/ETP are now implementing energy conservation projects and programs and also training others. Many countries are interested in private financing of projects and these projects range from development of minihydro sites to industrial cogeneration with varying fuels and sales to the grid.

The Minister of Natural Resources, Energy, and Mines of Costa Rica has identified energy conservation and the use of private power as major goals in the 1990 - 2010 Energy Plan.

These countries request "how to" courses covering technical, legal, and financial aspects of private power. Additionally, they want training on producing energy project feasibility studies which lead to private bank financing, as well as training for private bankers to enable them to recognize bankable energy project feasibility studies.

Institutional Saturation

In some countries, nuclei of CETP/ETP energy professionals dominate special working groups of energy-related agencies and parastatals. These individuals request new, more advanced courses.

> The Vice Chairman for Exploration and Agreements of the Egyptian General Petroleum Corporation is most interested in management courses for his middle management personnel which include the relationship between exploration and agreements. "They need to learn how to organize and manage a team effort".

Management training was the most often requested type of advanced training both where saturation was occurring and where others were supplying technical training.

Saturation for the existing curriculum is a new phenomenon in certain groups of CETP/ETP personnel where either a sufficient number of active trainees exist and they prefer more advanced courses, or where technical training is offered from a variety of sources. One example occurs in Egypt where there are other sources of technical training such as that associated with the international oil company joint ventures.

"Competition" from Other Donors

Trainee supervisors and other energy-related agency personnel often mentioned other appropriate training courses from other sources. These include petroleum technology courses from North Sea donor countries, energy conservation programs with locally residing project officers from the Canadians, management courses from the British and Japanese, and other technical training from Europeans and other US training organizations such as the International Human Resources Development Corporation in Boston.

These other groups can be competitive because they offer more advanced courses, or because they are given locally, or because they are shorter or longer. In other words, they are more closely driven by the specific training needs of the specific training market.

Training Locally Versus Training in the US

Local training officers, CETP/ETP trainee supervisors, and other energy-related personnel in the visited countries often encourage local training. In most cases they encourage local training because it meets their budgets or because it meets language requirements. Reviewing Figure 2, "Profile of CETP/ETP Participants" shows a smaller number of CETP/ETP trainees from both the French speaking areas of Africa and the Spanish speaking areas of Latin America than from other areas.

Generally, energy-related personnel in management who work

in the petroleum sector are most enthusiastic about US training citing the need for English in the international oil business and the opportunity for US contacts from the training programs. This enthusiasm begins to wane in English speaking countries such as Egypt where there is also more local competition from other training sources.

Many strong regionally oriented countries also prefer local training that they can help organize themselves. Often it is for specific energy resources that are similar across the region. The cities of Cairo, Nairobi, Harare, San Jose, and Quito are already home to local and regional energy organizations active in training that can play a lead role in new training programs.

Declining Interest in Energy at the Mission Level

Many of the countries visited have no local USAID energy projects or USAID energy officers. Yet they continue to participate in the ETP. In many cases, the ETP is carried out by native training or project personnel who believe that energy training is important for their countries and therefore process applications as an additional work activity.

Implementing existing or new energy training programs and courses where there are no technically trained individuals to carry them out is difficult. But an effort must be made to continue to reach these individuals who are making ETP happen now. This requires the use of simplified documentation and greater time allowances.

Is This the Time for Change?

To conclude, there are trends which appear capable of limiting participation in the ETP starting to appear in certain countries now. Also, energy personnel in these countries are interested in more advanced courses particularly in the management field as well as in new courses which meet the needs of the 90's. Now is a good time to plan for these changes.

CHAPTER SEVEN. QUESTIONS AND ANSWERS: ILLUSTRATIVE EXAMPLES FOR THE SCOPE OF WORK

There are a number of questions in the Scope of Work which request examples as answers. While the entire report addresses the Scope, the request for anecdotal evidence is thus far understated. In this chapter the balance between statistical and illustrative data is addressed.

Question 1. Have participants been of appropriate technical background and assignment to benefit from the selected training? Data to substantiate.

The statistical data to substantiate that training and candidates were appropriate are found in Chapter Five where the participants' view of changes in the program are addressed. Perhaps more interesting is the fact that where the trainee and the training were mismatched, people were adaptable enough to make a good experience from the error.

For example, when a senior physicist from Pakistan with a long career was assigned to undergraduate courses at the University of Denver, the mistake was immediately discovered. The distinguished scientist was promoted to a position as visiting professor where he gave courses and conducted research important to his nation's energy data base while using local computer capability. He and his country benefited enormously.

Or, for another example, when a senior bureaucrat returned home from the University of Pennsylvania course on energy policy, which had been his job assignment when he left India, he was needed to fill a high level vacancy in urban planning. The courses at Pennsylvania were very helpful because even though the energy content was no longer directly important, the knowledge about the policy formation process and the determination of public policy choices was essential to establish new urban planning priorities and procedures.

Question 2. Have benefits derived from the training been personal in that promotion or greater supervisory responsibility have accrued to the trainee? Data to substantiate.

The data which are presented in Chapter Four, "The Indicators of Success" address this question directly. Individuals have been deeply affected by their training. Seventy nine (79) showed a positive impact, even though promotions in the developing world are based generally on seniority, not training.

Two interviewees, for example, from the Ministry of Energy in Kenya were transferred to new positions in the Central Bank of Kenya and the National Oil Company of Kenya as the first economists with energy training. They now carry responsibility for allocating foreign exchange resources for energy products and

equipment within their organizations.

What the data cannot tell is the satisfaction that the participants received from the sense of confidence and the level of professional competence that are associated with the training. The interviewers saw the smiles that crossed the faces of the trainees when the questions were asked. These smiles, accompanied by the statement that they could now do their job, indicated that the support that the participants gave to the program in their statistics was personally profound.

An almost universal phenomenon was the concern expressed that the person was being exposed to a global competitive standard by being thrown in with participants from many nations. There was surprise and delight that they could survive, and indeed, a bit of national chauvinism came through from time to time. Each country's participants felt that they and their compatriots were better than average - itself a statistical feat.

Question 3. Have there been any discernible downstream effects within the LDC organizations of the participants training, negative or positive? Specific instances.

The statistical data in Chapter Four note that almost all participants assert that they have had an impact on their institutions. Furthermore, no-one had a negative experience. There is evidence of considerable energy saved in the industrial conservation and agency reorganization efforts, on the order of millions of dollars in many countries; and of equipment of utilities protected by measures that trained participants brought to their organizations.

Reduction of system failures in Thailand and equipment damage in Tanzania were gratefully acknowledged. In sum, the cost of training has been paid back many fold by savings and avoided costs throughout the world. Years ago, USAID had a capital expenditures program. This training has been a capital savings program.

Virtually everywhere, the introduction of the personal computer was a resounding success. Individuals who were once in a quiet corner of their organization now found themselves computer "gurus" and much in demand. Lotus 123 spreadsheets have become the Lingua Franca of USAID trained engineers, economists, and planners.

There were, however, barriers to implementation that reduced some of the promise of the efforts. There are stories of management ignoring routine maintenance and continuing the "run it until it breaks" school. There are implications of corruption and that requirements for commissions on new equipment entice people to this behavior. There are stories of rejected advice based on reasoning too complicated for untrained managers. There are instances of indigenous fuel replacement for imports being

frustrated by very conservative management. In sum, the lamentations do not outweigh the positive impacts, but for many of the participants, "the glass is half empty, not half full".

Question 4. Have there been specific instances of private or governmental institutional development and/or public policies changed or initiated subsequent to participants training? Give country examples, if any.

One major example of an indigenous expert, trained by USAID, being in the right place at the right time occurred in the Philippines. The expert was able to overcome the private power inhibitions of his utility when foreign consultants, whose symbolism threatened the loss of sovereignty, were unconvincing.

During the last three years, a group of Philippine economists were trained at the University of Pennsylvania. Included in the technical and economic subjects were course materials on long term marginal cost and avoided cost analyses. These concepts had a major impact on the ability of trainees to communicate the value of privatization to senior policy makers. They also showed how negotiations with foreigners could be measurably evaluated in the national interest.

This judgment regarding the impact of local analytical capability was traced through to the next level of policy making and confirmed. After examining the private power document written by the Philippine staff, it is very clear that the training in the U.S. had a major, liberating impact on senior management to finally take a privatizing decision long in the making.

Question 5. Have any of the trainees been introduced to U.S. private industry in their training and been able subsequently to pursue that relationship in their technical or official capacity? Any examples?

In Thailand and Pakistan, the evidence was quite strong that training had led to sales, better understanding of American commercial interests and negotiating style, or contact with firms. In other countries, fewer examples were found, although this should not be the source of generalization.

In Thailand and Pakistan, visiting American oil exploration teams were better able, through the work of participants, to get data needed to judge commercial potential. In Pakistan, the power company purchased software that the trainees introduced. The significant limit on these kinds of sales is the lack of overseas aggressiveness of American business. Most trainees never had follow up contact with American firms, even though they were favorably disposed to do so. If there are to be any private sector results from training, it will have to be more consciously planned and taken seriously by the private sector itself.

America does not have a mercantilist tradition in which government helps business with foreign sales, as does its many competitors. "Laissez faire" U.S. government marketplace ideology literally translates to the private sector policy of "leave them alone". With a few notable exceptions, that is what American salesmen have done to the trainees.

It should not be necessarily assumed that business is "lazy" about foreign sales. The U.S. energy export sector may no longer be competitive and U.S. business may have concluded that the market is not worth recapturing.

Question 6. Have those countries with mission-funded energy projects been in a position to benefit more significantly from this centrally funded training than those without? Any examples?

The answer to this question is a complicated "yes". Yes, because the existence of on-going energy projects created a market for both information from training and trainees themselves. The concept of critical mass was highly evident in the Philippines and in Costa Rica where there have been highly active mission and central programs.

One part of the complicated yes is that centrally funded programs in missions were generally likely to produce the most visible multiplier. In part this is true because centrally funded programs usually have their own training component which augments the critical mass.

The other part of the complication is that training is a necessary, but not sufficient condition for economic development. So, for example, the existence of a highly qualified group of energy sector trained Filipinos did the country little good when the national energy policy was implemented under a corrupt government. Energy is an internationally traded commodity and funds are subject to diversions, if the country leaders are so disposed.

Or, an example of difficulty in implementation can be found in Pakistan's electrical utility, where trained people are rotated away from their expertise in an attempt to wake up dead wood. There is perhaps no better mission in the world where centrally funded projects are better coordinated with mission activities. On the first day of arrival, the evaluator was faced with the best paper work he had ever seen on rational policy process formulation and execution. The remaining days were a contradiction in the expectations established, due to the wide variation in agency performance from successful petroleum sector efforts to problematical geological research.

Thus, the answer is more complicated than a simple "yes". The best successes were found when a single, well intentioned and caring, individual was able and willing to take advantage of the resources placed at the disposal of the mission by the central

office. The bureaucratic design also needs a good bureaucrat.

Question 7. Which five or six LDC's have benefited most from the participant training efforts in energy? Are the same or similar factors at work in each? Please describe.

If quantitative criteria are used, then the largest countries have clearly saved the most barrels of oil through conservation, application of more of the newer techniques, etc. In that case, India has been the major beneficiary of the program. Also in that case there has been a considerable indigenous effort which may or may not have required the training project. The analyst could not discover whose effort was more important for the considerable effect that has resulted.

If the criteria are adjusted for national size, then Costa Rica is a major beneficiary. Critical mass was achieved there and the caring individuals were present and the success has been manifest in an impressive number of areas within the energy sector.

If the Aquino revolution is given credit for introducing rationality to replace greed in the political system, then the Philippines shows the most promise of realizing the benefits from energy training. Here, the mercantilist Japanese are following up on the American start and will employ the American-trained people to accomplish an ambitious Asian energy program.

If the abysmal performance of the government institutions in the Dominican Republic is discounted and the private sector performance of the participants who opened up their own service companies is counted, the ranking goes from no impact to a very high impact on the country's savings of energy.

If the legislative policy of the Thai government favoring conservation were given credit and the availability of trained people there to implement the policy in a strong feedback loop were recognized, then a classic success story will unfold in that country.

Conversely, lack of an energy agency nucleus and changing government policies in Ecuador have prevented some well-trained participants there from achieving their goals.

The message is not simple. Success comes from a confluence of forces, only some of which are under the control of USAID. There is only one set of common factors here. The successes have different origins, but they all required the presence of trained people when the political forces were ready to act.

Question 8. As a simple human resource development effort is "energy training" in LDC's worth pursuing under current economic circumstances? Please explain.

The answer is colored by the definition of "current economic circumstances". If that situation is looked at from the point of view of the LDC's economies, they can little afford the waste and inefficiency that ignorance breeds. As the bumper sticker says, If you think education is expensive, you should try ignorance".

If the situation is looked at from the point of view of the reduction of public budgets and the view that a retreat from the global economy is a wise and inevitable policy, even as our competitors are doing the opposite; then we might suppose that training our future customers is a luxury we cannot afford. It would be all well and good to use the funds to train American workers rather than foreigners, but then where will the American workers get the customers?

In sum, the answer to this question is based on numerous assumptions about America's role in the world and the world's role in America. The answer tells more about the answerer than about the situation. This much can be said from the data: if the training efforts are to reap economic reward to the American economy through trade, then better coordination and complementarity among the private sector, USAID, multilaterals, and other U.S. Government efforts are required.

CHAPTER EIGHT. CONCLUSIONS AND RECOMMENDATIONS

The major conclusions of this study lead to the major recommendations.

CONCLUSION #1. THE TRAINING PROGRAM WAS PERCEIVED TO BE A GREAT SUCCESS BY THE PARTICIPANTS.

The criteria for success are an acknowledged positive impact on the individual, on his/her institution of employment, and on his/her country.

CONCLUSION #2. A SIZABLE MAJORITY OF THE PARTICIPANTS FELT THAT CHANGES WOULD BE DESIRED.

About one third of the participants could think of no way to improve on their experience, but two thirds made suggestions.

CONCLUSION #3. INTERVIEWS WITH PARTICIPANTS AND NON-PARTICIPANTS INDICATED THAT IMPLEMENTATION OF THE TRAINING COURSES IS IMPEDED BY BARRIERS, MOSTLY FROM MANAGEMENT.

Training is a necessary, but not sufficient condition, for improvements in the energy sector. Knowing what to do is difficult enough, but getting it done is even more difficult.

CONCLUSION #4. THE TRAINING PROGRAM CANNOT REST ON ITS LAURELS. THERE ARE CHANGES GOING ON THAT PROFOUNDLY AFFECT ITS DESIGN.

"Competition" from other donors, new curriculum demands, the challenges of the 90's; all require new thinking and program design while maintaining the successes of the past.

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These conclusions lead to recommendations which deal with the dynamic situation in which the training program now finds itself. Some of these recommendations are already part of the newly emerging curriculum and recent program modification efforts, but they were arrived at independently through evidence from the field work.

RECOMMENDATION #1. THE CURRICULUM SHOULD BE RECAST TO A PROBLEM SOLVING ORIENTATION IN ORDER TO FACILITATE IMPLEMENTATION BY THE PARTICIPANTS OR THEIR SUPERIORS.

The technical orientation of the courses is appropriate, but the focus on solutions should be supplemented by a prior

understanding of the problem definition. The course designs generally assume that ignorance is the problem and that imparting knowledge will provide the cure.

Ignorance is a very small part of the problem in the energy sector. It is the capacity to implement that is the key barrier. Emphasis on helping senior management perceive the problem is sometimes essential to getting a return on the training investment.

RECOMMENDATION #2. KEEP THE FOCUS ON IMPLEMENTATION: COMPLEMENT TRAINING WITH TECHNICAL ASSISTANCE.

In addition to attacking the problem of implementation through curriculum changes, there is also an opportunity to reap greater dividends from training if it is coordinated with technical assistance efforts. The most successful training efforts in terms of impact took place where there had been a related and complementary technical assistance effort.

RECOMMENDATION #3. FOCUS ATTENTION ON INDIGENOUS FUELS. NOT ALL NATIONS CAN NOW ECONOMICALLY AFFORD, NOR WILL THEY BE ABLE TO ECOLOGICALLY AFFORD, PARTICIPATION IN A FOSSIL FUEL BASED GLOBAL ENERGY ECONOMY.

Training curricula that increase dependence on a fossil base may have grave future consequences. Curricula which try to establish renewable energy for its renewability will find limits in justifying capital costs. It is more important to focus attention on the indigenous capacity, sometimes renewable, sometimes not; to have a portion of the national fuel mix dedicated to getting experience for the future and providing some energy in the present that minimizes importation of hard currency based fuels.

In the 70's the underpinning force for replacing fossils was limits on fossil supplies, in the 90's the limit is combustion gases. When the confirmation arrives that global warming is a threat, and Congress is preparing even now, the lead time will not permit starting from ignorance.

Training provides a global insurance policy that there will be time to switch over. The issue of who pays for the insurance is not addressed by this recommendation. The "Tragedy of the Commons" where no-one protects common resources remains an issue for global political and financial institutions.

RECOMMENDATION #4. PLACE MORE EMPHASIS ON MANAGEMENT OF RESOURCES; HUMAN, PHYSICAL, AND CAPITAL AS THEY APPLY TO THE ENERGY SECTOR.

While it may require attracting some new participants from

new sources, and may require both modifying existing courses and the creation of new courses, the demand for management training is very high and very needed if implementation is the goal. Training for management in the abstract is not the target, but energy sector specific training is the target.

There is room for at least three levels of management training: sector management in which fuel mix planning is taught; project evaluation, in which project management level skills are communicated; and facilities management, in which power plant or other high consumption or production facilities are targeted. Presentation and design are critical to the success of these efforts.

For example, the technical and management skill courses can be continued and technical assistance given in developing national and project level energy data. This would be followed by short, problem solving, regional seminars for high level decision makers. They can bring their previously U.S. trained staff, problems, and data to the seminar for case study analysis.

Such a design integrates and multiplies the effectiveness of the Office of Energy and its training arms. The vision of the global energy future and the environment can infuse the tradeoffs at the policy level and give concreteness to the policy dialogue, making it more financable as well.

RECOMMENDATION #5. IMPROVEMENTS ARE NEEDED IN TRAINING PROGRAM HOUSEKEEPING PRACTICES.

Numerous difficulties and losses of candidates have occurred because of delays in the selection process. There are many individuals who review the selection of candidates and each of these training bureaucracies, committees, ministries, official groups, agencies, supervisors, individuals, etc. retains the course announcement.

They then hold up the sequence of selection, determine appropriateness, review candidates from too far or too close, seek further clarification of the course announcement, wait until the next meeting, and finally let the winners know -- after approval in the US is granted. Winners are rarely given three weeks to prepare to depart or find a replacement. The longest lead time experienced in the field work was three weeks and the shortest was eight hours.

The correction of this problem requires either a longer lead time before the announcement, clearer and more descriptive announcements, technical assistance to training bureaucracies regarding their procedures, and/or a training ombudsman to track the procedure whose salary would easily be paid for by fewer "no shows"

RECOMMENDATION #6. CREATE A PROACTIVE ALUMNI ASSOCIATION EMPLOYING SATELLITE COMMUNICATIONS FOR CONTINUING EDUCATION, AN ELECTRONIC LIBRARY, AND TECHNICAL ASSISTANCE.

In the global competition for candidates and in the commercial competition as well, the program would be well served by the drama and efficiency of communications that such a system would support.

There is a vast amount of good will, as testimony by the interview statistics indicates. There is a strong interest in continued participation, even trade. A cost shared satellite that communicated selections from new textbooks, problem solving materials, and equipment catalogs would capture the imagination of the alumni and increase the demand to be a candidate for the USAID global network of trainees and alumni.

EXHIBIT A

CODE BOOK & INTERVIEW FORMAT

This document presents the issues transformed into questions and categories of responses taken from the interview situations. The codes were derived from actual answers, they were not predetermined nor were they shared with respondents as multiple choices.

CODE BOOK
and
INTERVIEW FORM
TRAINING IMPACT EVALUATION

12/27/89 VERSION 3.0

SPECIAL INSTRUCTIONS FOR THE CODER:
If the question was not asked, enter a 0 in the tedf3 file. If the question was asked, but the situation of the interviewee is such that the answer is not meaningful for the context of the question, (e.g. Just returned from training and not yet assigned, so impact is not yet meaningful.) record an, Other, coded as # 9, in the tedf3 file. Also, make a comment in the tedf4 explanation and expanded comment file.

Name or ID number of interviewee:..... CONFIDENTIAL

1. Training Site
F01
1.__ TVA1
2.__ TVA2
3.__ ADL
4.__ UPA1
5.__ PTRI or IPCS
6.__ Westinghouse & GE
7.__ OGCI
8.__ ASEAN Planning or Coal
9.__ A University
0.__ Other

2. Impact of Training on Interviewee: Personal
F02
1.__ Improved Sense of Ability to Handle the Job, More Confidence
2.__ Better Relations with Peers
3.__ No Change Evident

3. Impact on Job Status: e.g. Promotion
F03
1.__ Could carry out assignments, expectations
2.__ Has more responsibility
3.__ Formal promotion given
4.__ Salary increase, but same status
5.__ No change in status or income
6.__ Management barriers to impact

4. Impact on Institution: e.g. Ability to Carry Out Its Function
F04
1.__ Raised consciousness
2.__ Changed housekeeping practices
3.__ Caused capital investment
4.__ Recorded Savings
5.__ Supported continuance of group
6.__ Implemented program(s)
7.__ None

5. Impact on Institution: e.g. Internal Communications
F05
1.__ Oral transmission of information on the job
2.__ Gives seminars
3.__ Writes papers, develops data collection forms
4.__ Makes training documents available

5.__ Broadly impactful in different media, (interviewer judgment)
6.__ None

6. Supervisor Verification (In some cases, supervisor is available an can generally verify that the interviewees' characterization of impac is correct. If supervisor not contacted, enter 0 code.)
F06 1.__ Expression of general positive attitudes toward training
2.__ Singles out specific interviewee for positive comment
3.__ Wants more people trained
COMMENT.....

7. NOT A QUESTION, Interviewer Estimate of Positive Impact of Training
F07 1.__ 1 Barely positive
2.__ 2
3.__ 3
4.__ 4
5.__ 5 Positive strong impact
6.__ 6 Unusually pervasive impact on institution, e.g.becam manager of unit, author of policy change, and/or technological innova- tion, etc.

8. Training Mismatched to Job
F08 1.__ Reorganization of institution altered interviewee assignment
2.__ Selection of course incorrect due to faulty or late info
3.__ Country selection process uses irrelevant criteria
4.__ Project for which trained has not materialized
5.__ Particular job site in US not really parallel to site at hom
6.__ Assigned to new post on return

9. Maintains Contact with Peers or Mentors
F09 1.__ Has technical discussions, correspondence
2.__ Contact is social, e.g. Holiday greetings
3.__ No contact

10. Impact of training is Negative
F10

11. Barrier to Change: Personal Readjustment to Return
F011 1.__ None
2.__ Some
3.__ Missed American enthusiasm for work

12. Barrier to Change: Institutional Resistance in Own Agency (o Group's Targeted Audience Outside Institution in Case of Conservatio Agency)
F12 1.__ None

2.__ Own group management resists new behavior
3.__ Studies done, but no implementation
4.__ Ignorance prevents action
5.__ Personnel policies rotate people away from expertise
6.__ Confusion of institutional responsibilities
7.__ Job for which trained not yet available

13. Barrier to Change: Financial
F13 1.__ Unable to spend for capital improvements
2.__ Unwilling to Spend
3.__ Reluctance based on financial considerations, but no detail
4.__ Shortage of foreign exchange
5.__ Finances not mentioned as a barrier

14. Possible Means to Overcome Barrier(s)
F14 1.__ Government financial incentives program
2.__ Train institution's managers
3.__ Coordinate training with technical assistance
4.__ Adapt materials to local circumstances
5.__ Clarify conflicting objectives of institutions

15. Relevance of Training to Job When Returned
F15 1.__ Essential, could not do job without training
2.__ Very helpful
3.__ Most training helpful, some not relevant
4.__ Not really relevant, but interesting experience
5.__ Training too general to be useful
6.__ Not yet assigned to job for which trained

16. Relevance of Training to Current Job
F16 1.__ Essential, could not do job without training
2.__ Necessary to move from old job to current one
3.__ Helpful as a stepping stone to present
4.__ Decay rate of value of training is high
5.__ Not yet assigned to job for which trained
6.__ Institution limits application of training
7.__ Training too general

17. Desired Changes in Course Content
F17 1.__ More hands-on experience relative to classroom
2.__ More specialized content preferred
3.__ Satisfied in general
4.__ More on coal
5.__ Other specific suggestions
6.__ Students from too mixed backgrounds

18. Desired Changes in Infrastructure of Program
F18 1.__ Personal arrangements, housing
2.__ Assistance with cultural or logistic adjustments

3.__ Stipend insufficient
4.__ None
5.__ Tangible certificate needed
6.__ Deal with city safety issues
7.__ Conditions of living should vary by age and experience

19. Most Useful Experience in U.S.
F19 1.__ Plant visits
2.__ On-the-job training
3.__ Exposure to technologies
4.__ Knowledge Base
5.__ American openness among peers and teachers
6.__ Socio-cultural broadening, can deal better with foreigners
7.__ Work habits
8.__ Computer use

20. Most Memorable Experience on Return
F20 1.__ I could do my job
2.__ Put to use on important assignment
3.__ Happy to be home
4.__ Tools learned and their impact on work

21. How Co-workers View Participant's Experience
F21 1.__ Would like to go themselves
2.__ Calls on participant as resource person

22. Limit to Usefulness of Training
F22 1.__ Basic information exceeded soon
2.__ Not specialized enough as assignments grow in complexity
3.__ No perceived limit, core knowledge always useful
4.__ A person's attitude
5.__ If person's position in organization is too low
6.__ Diversity of student background too great
7.__ Too theoretical
8.__ None

23. Would New People Benefit if the Course Were Repeated?
F23 1.__ Yes
2.__ Not really, demand saturated
3.__ No
4.__ Only if more advanced course
5.__ If better matches of trainee to courses is made

24. Changes Needed So More Could Benefit - Curriculum
F24 1.__ Make longer
2.__ Make Shorter
3.__ Make more on-the-job experience
4.__ Generally satisfied
5.__ More books needed
6.__ Changes in course content desired(see notes for specifics)

7.__ More social life

25. Advantages if Taught in the Region - Suggested by Interviewee
F25 1.__ None
2.__ Indifferent if resources made available
3.__ Generally acceptable
4.__ Would benefit from similar, familiar resource base
5.__ Could send more participants
6.__ OK for theory but not for applications

26. Advantages if Taught in Region - Prompted by Interviewer, if no Response to Above Question
F26 1.__ Good if cost savings makes it possible to train more people
2.__ Acceptable if necessary
3.__ No advantage is worth it, train in the U.S.
4.__ Easier for Muslims, religion and diet
5.__ Might get Seniors to show them problems at home

27. Losses if Taught in the Region
F27 1.__ Resources not Available; libraries, experts, technologies
2.__ As in 1, add inhibitions to open discussion if in region
3.__ Language barriers, food
4.__ Limits cultural contact to neighboring nations, not global
5.__ None

28. NOT A QUESTION. By this time the exposure to the participant should give the interviewer a basis for judging whether, and to what degree, the earlier questions on impact of training were accurately assessed. Review your answer to Question 7 on the success of the impact. If Question 8 indicated a mismatch between training and job, estimate the participant's chances to make up the lost time. That means you find the reasons given below acceptable and the value of training will not be lost. Do not break the logic of the interview at this time, but keep the question in mind as you proceed, and fill out the data base field (F) code later...

Make Up for the Mismatched Training
F28 1.__ Reorganization responsible for uncertainty of position - OK
2.__ Project for which trained not finished - will be soon enough
3.__ Temporarily detailed to a different assignment - will return
4.__ Supervisor had only set broad goals at selection - will adapt
5.__ Promoted to even more impactful job where training is less applicable, but value enhanced, not lost
6.__ A real lost situation, no redeeming value perceived
7.__ Sent to wrong course, but transferred in time

29. Participant Recommends Different Selection Criteria
F29 1.__ No, process brings the right candidates forward
2.__ Yes, current process is too political
3.__ Yes, too bureaucratically inefficient
4.__ Does not know why he/she was selected

5.__ AID should stay involved in selection
6.__ Candidate screening inadequate
7.__ Info about courses insufficient for selection

30. Participant Would Like to be Trained Again
F30 1.__ Yes, depends on the training
2.__ No

31. What Courses Desired if Second Time
F31 1.__ On-the-job training
2.__ No specifics offered
3.__ More advanced
4.__ Short course in specialized topics
5.__ Design Engineering
6.__ Cogeneration
7.__ Fluid bed combustion

32. Preferred Locus of Second Training
F32 1.__ If short, indifferent
2.__ If long, US again
3.__ U.S.
4.__ In Region
5.__ In Europe

33. Desired Duration of Second Training
F33 1.__ Duration determined by course requirements
2.__ 2 months or less
3.__ 3 months or more
4.__ 6 months to one year
5.__ an academic degree

34. Ways in Which Participant's Country Benefits from Training
F34 1.__ Builds indigenous expertise rather than reliance on foreigner
2.__ Efficiency of resources use (e.g. fuels, energy savings)
3.__ Better resource allocation (in sense of planning or economy)
4.__ Speeds up relations with foreigners in business or diplomacy
5.__ Ultimately reduces debt
6.__ Broadens trainee
7.__ Creates trade

35. Changes Needed to Achieve Still More Benefits
F35 1.__ Train More People
2.__ Form better work attitudes
3.__ More equipment should be available to support work
4.__ Send country teams as a group
5.__ Stop brain drain from government to private sector
6.__ Send better selected people
7.__ Better dissemination of ideas

36. Provide for Senior Level Training of Superiors

F36
1.__ Yes
2.__ Yes, would help communicate unfamiliar concepts
3.__ Not necessary
4.__ Yes, but case specific

37. Ways in Which America is Perceived as Benefiting

F37
1.__ Easier to negotiate agreements if procedures are known
2.__ No ideas on subject
3.__ Trade, e.g. equipment sales
4.__ Help pay off debts
5.__ Overcomes cultural misconceptions
6.__ Spreads democracy

38. Comparison With Training Reputation of Other Countries

F38
1.__ More hands-on training offered elsewhere
2.__ Language barrier, especially Germany or sometimes Japan
3.__ Japanese communicate motivation for conservation
4.__ Sweden has good balance of hands-on
5.__ Not national differences that stand out, just courses differ
6.__ By reputation, U.S. most effective
7.__ Others train for equipment sold
8.__ Others more theoretical

39. Academic versus Applied Training

F39
1.__ Applied Training is needed most
2.__ Policy and Planning benefit from academic degrees
3.__ Specialization may require a degree
4.__ I want a degree, e.g. good for promotion in government
5.__ Varies by job, ops people = technical; office = academic
6.__ Academic if young candidate
7.__ Mix 50-50

40. Evolution of Training Needs as Institutions Evolve

F40
1.__ Moves to more division of labor so specialization needed
2.__ Specific, short intensive courses become useful
3.__ As above, but continue with core curriculum
4.__ Institution and its function are stable, no change training
5.__ Equity and quality are next priorities
6.__ Self taught program, if materials provided
7.__ More on-the-job training needed

41. What Questions Should Have Been Asked About Your Training, But Were Not Asked?
or .. What is on your mind about your training that I did not ask?

F41
1.__ Cannot think of anything left out
2.__ Alumni Association desired
3.__ More business training needed for management

4.__ Like the rapid scan of broad curriculum so can deepen later
5.__ Technology transfer would be good for all
6.__ Aim for broader audience than participants

If this interview had a number of interesting comments and you feel attention should be brought to the interview, please code a 1 in F42.

F42 1.__ Note this interview for further comments in tedf4

F43 1.__ Born before 1945 In 1990 - 46+
2.__ 1945 - 1950 40 - 45
3.__ 1951 - 1955 35 - 39
4.__ 1956 - 1960 30 - 34
5.__ age unknown

EXHIBIT B
INTERVIEWS AND MEETINGS IN TWELVE COUNTRIES

NAME LISTS

DSI DEVELOPMENT SCIENCES INC.

53

THE PHILIPPINES

CETP/ETP Participants Interviewed

Artemio P. Habitan	Conservation, Energy Affairs
Wayne Abayan	"
Clovis Tupas	"
Teddy Casacop	"
Charles Cordero	"
(Ms.) Lourdes Galsim	"
Danilo B. Cantiller	Mgr. Econ. Department NPC
Edgardo M. Orencia	Chief, Econ. Department NPC
Quintin R. Verzosa	Mgr. Protective Relaying Div.
Mario C. Baile	Mgr. CPSD, Econ. Department
Renato Guieb	Prin. Eng. Quality Assurance
(Ms.) Norma R. Macapagal	Sr. Chemist " "
Alex A. Geremias	Act. Prin. Engr. R&D Dept.
Horacio Roque	Prin. Research Economist
Fortunato C. Leynes	Act. Mgr. PSADP, SOD

USAID Personnel

Michael C. DeMetre	Chief Engineer, OCP
(Ms.) Conchita C. Silva	Energy Program Mgr.

Other Personnel

Felino F. Balce: Mgr. Tech. Train. Div. (HRODD) Human Resource and Organization Development Department
R. B. Boomasong: Dep. Exec. Dir. for Energy Operations
(Ms.) Mildred N. Cadoc: Chief, Conv. Res. Div.
Alexander B. Cortez: Mgr. Manpower & Organization Dev.Div.(HRODD)
Paquito F. Garcia: Officer-in-Charge (HRODD)
(Ms.) Charisse B. Tablante: Head, Conservation Group En. Affairs

THAILAND

CETP/ETP Participants Interviewed

Kittisobhon, Ameriporn	Nat. Energy Admin.
Tangtrakul, Mingsak	Nat. Energy Admin.
Buranasajja, Suree	Nat. Energy Admin.
Chaitanwat, Ratanawimon	Energy Generating Authority
Asawaprecha, Surachai	Metro. Elec. Authority
Kiatboonsri, Sukit	Metro. Elec. Authority
Wijittongruang, Prasert	Metro. Elec. Authority
Chidsin, Pichyun	Metro. Elec. Authority
Piryapun, Nupong	Project Management EGAT
Pityachawan, Paitoon	Corporate Planning EGAT
Chootinuntn, Verachai	Corporate Planning EGAT
Varavoot Siripol	Power System Planning
(Ms.) Kanokwat, Panada	Petro. Auth. of Thai
Bulakul, Surong	Petro. Auth. of Thai
Roadrungwasinku, Sonchai	Planning, Petro. Auth. of Thai

USAID Personnel

Sampongse Somesook	Training Officer

Other Personnel
William Dawkins: Commercial Attache, DOC
(Ms.) Usuma: Training Officer, DETC
Amorn Phandhu-fung: Trainer
Pramote Iamsiri: Trainer

INDIA

CETP/ETP Participants Interviewed

Ashok M. Joshi	Central Elec. Auth.
Ashok Kumar Malik	Central Elec. Auth.
Naqua, S.W.H.	Central Elec. Auth.
Krishnan, Dharmarajan	Urban Development
Desari, Satyanarayana	Central Elec. Auth.

USAID Personnel

S. Padmanabhan	Energy Officer
A.R. Sabharwal	Training Officer

Other Personnel
P.K.Goel: Executive Director Petroleum Conservation Research Association
S. L. Jain: Director, Training Central Electric Authority

PAKISTAN

CETP/ETP Participants Interviewed

Ali Syed Azkar	Division of Projects DHODAK
Sheikh Ehtesham Haider	Concessions Management "
Shahzad Humayoun	Exploration "
Naseem Kalid	Petro. Field Sup. Min. Mine
Shah Saeed Ullah	Petro. Geo. "
Ansari Nasreen Zia	Stat. "
Muzzafar Kamran	Eval. Hydrocarb. "
Shassan Zaidi	Planning Dept. WAPDA
Hussain Ghulan	"
Asad Jaleel	Stat.Data Mgr. Pak.Geo.Sur.
Nayyer Alam Zaigham	Geophysicist "
Ghaznavi M. Ishaq	Dep.Dir. Snr Geologist "
Mahmood ul Hassan	Geochronology, "

USAID Personnel

Ahmad Anjum	Energy Prog. Mgr.
Zulfigar Ali Qureshi	Energy Prog. Mgr.
Massood Malik	Senior Adviser, Energy Wing

Other Personnel

Symnon Khan	Supervisor

EGYPT

CETP/ETP Participants Interviewed

Hani A. Alnakeeb	Organization for Energy Planning
Ibrahim Abdel Gelil	" " "
Hamed Ali Korkor	" " "
Hani Ahmed Fathi	General Petroleum Corporation
Mohamed Saher Said	" " "
(Ms.) Fatma Ahmed Mustafa	Egyptian Electricty Authority
Maher Aziz Bedrous	" " "
Essam Gamal	General Petroleum Corporation
Hani Hussein Nasr	" " "
Hassan Ali Attia Foda	Egyptian Electricity Authority
Mourad Badie Attia	" " "
Anwar Salama	Egyptian General Petroleum Corp.

USAID Personnel

Sherif K. Arif
(Ms.) Salwa F. Wahba

Other Personnel

Arafa Ahmed El Ostax: Supervisor, GPC
Ahmed A. Sweify: Supervisor and Chief Geologist, GPC
Sayed Matbouly: Department Head, EGPC
Salah Hafez: Vice Chairman, EGPC
Ahmed Ahmed Amin: Deputy Chairman, EEA

KENYA

CETP/ETP Participants Interviewed

Jackson Njoroge Ndungu	Ministry of Energy
Don Riaroh	" "
Peter M. M. Mulli	" "
John N. Githinji	" "
Evanson Obare Omboga	" "
John K. Mwega	Central Bank of Kenya
(Ms.) Mary Wangari Mwathe	National Oil Corp. of Kenya
Nashon King'oina	Kenya Polytechnic Institute
Nofatos Munyu	Ministry of Energy
Samuel Gichere	MOE: Natural Resources
Punit L. Shah	United Textiles Co., Thika

USAID Personnel

(Ms.) Theresa Muraya
Stephen Ragama

Other Personnel

(Ms.) Emily Gatuguta: Supervisor and Senior Ass't. Sec., MOE
Ephantus Gitonga: Chief Personnel Officer, MOE
Michael Katsivo: Manpower, Personnel, Office of the President
Tim M. Wakesa: Manpower, Personnel, " "
G. L. M. Nzioka: Manpower, Personnel, " "
James Nugent: Kenya/Canada Energy Advisory Project, MOE
John T. Drover: " " " "
M. George Mansour: Senior Chief Engineer, Hilton International

Alfred M. M'Imanyara: Chief: Renewable Energy, MOE
Paul W. Magoha: Energy Conservation, MOE
Augustine Otieno: Solar and Wind Energy, MOE
Joseph Kiawa: Industrial Energy Conservation, MOE

TANZANIA

CETP/ETP Participants Interviewed

Nsajigwa Mwaisaka	Tanzania Electric Supply Co.
Christopher Sumary	" " "
Isaac Minja	" " "
Joseph Shayo	Ministry of Energy and Minerals
Bashiri J. Mrindoko	Ministry of Energy and Minerals
Lebbi Changullah	Tanzania Electric Supply Co.
Halfani R. Halfani	Tanzania Petroleum Development Co.
Maneno Katyega	Tanzania Electric Supply Co.
A. M. A. Sirima	Friendship Textile Mill Ltd.

USAID Personnel
(Ms.) Flora Majebelle
Joseph Stepanek
Joel Strauss

Other Personnel
K. K. Iranga: Supervisor, TESC
Patrick Rutabanzibwa: Senior Engineer for Gas, MOEM
Mark Mwandosya: Supervisor and Comm. of Energy and Pet., MOEM
Sylvester Mandilindi: Manpower Development Officer, TESC

ZIMBABWE

USAID Personnel
(Ms.) Sarah Bishop
Douglas R. Pickett
Golden D. Chekenyere

Other Personnel
Paul B. Larsen: First Secretary, American Embassy
James L. Zinyuku: Chief Engineer, Zimbabwe Elect. Supply Auth.
J. P. Chirara: Under Sec., Dept. of Energy Resources & Develop.
(Ms.) Juliet Chadzingwa: Under Sec., " " "
H. S. Makina: Director, " " "
Don Priestman: Chief Planning Adv., Zimb. Elect. Supply Auth.
E. G. R. Turner: Ass't. Director, Confed. of Zimb. Industries
M. A. S. Mpundu: Managing Director, National Oil Co. of Zimb.
Geoffrey Stiles, Field Mgr., Industrial Energy Cons. Project

COSTA RICA

CETP/ETP Participants Interviewed

Daniel Baudrit	Bel Engineering
Ulyses Odio	Instituto C.R. de Electricidad (ICE)
Javier Sanchez	" "
Kenneth Bolanos	Recope
Luis Koss	Industria Nacional de Cemento, S.A.

Luis Barquero	ICE
Luis Pacheco	"
Olman Barboza	Recope
Raymond Gray	ICE
Manuel Soto	"
Carlos Solano	"
Alexander Barrantes	Recope
Jose Blanco	Min. of Nat. Res., Energy & Mines
Rodolfo Gallegos	Recope
Rafael Yglesias	"
Jose Ruben Naranjo	"
Ronald Lopez	Falcon S.A.

USAID Personnel
Heriberto Rodrigues
Inez de Rodriguez
Lewis W. Lucke
David Losk

Other Personnel
Alvaro Umana: Minister of Nat. Res., Energy & Mines
Milton Esquivel: Chief of Energy Training, ICE
Mayra Chacon: Training Officer, ICE
Rodolfo Brenes: Supervisor and Mgr., ICE
Flor Quesada: Training Officer, Recope

ECUADOR

CETP/ETP Participants Interviewed

Ivan Heredia	PetroEcuador
Jorge Duque	Polytechnic: Guayaquil
Francisco Andrade	" "
Ouillermo Pincay	" "
Ernesto Recalde	Bureau Veritas Ecuado S.A.

USAID Personnel
Fausto Maldonado
Richard J. Peters
(Ms.) Catalina Leon

Other Personnel
Jorge Soto Casares: Training Director, Elect. Auth. (INECEL)
Santiago Ordonez: Energy Planning, Nat. Energy Instit. (INE)
Horacio Yepez: Executive Director, " " "
Franklin Carrasco: Energy Devel., " " "
Eduardo Procel Peralta: Training Director, PetroEcuador

DOMINICAN REPUBLIC

CETP/ETPParticipants Interviewed	
Carlos E. Fernandez	Owns Private Company
Victor S. Hernandez	Owns Private Company
Fernando Perdomo	USAID Engineer
Nelson Chavez	Owns Private Company
Luis G. Alou	Private Company

USAID Personnel	
Fernando Perdomo	USAID Engineer

JAMAICA

CETP/ETP Participants Interviewed	
Philip Jackson	Jamaica Public Service
John Channer	JPS
John Murray	JPS
Lenward Holness	JPS
Alan Graham	JPS
Leonard Edwards	Min.of Mines & Energy

USAID Personnel	
R. Mathews	Chief Engineer
(Ms.) Sandra Carr	Administrative Assistant