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THE INSTITUTIONAL STRENGTHENING TASK:
EVALUATION REPORT

MARCH 1986

RENEWABLE ENERGY RESOURCES
FIELD TESTING PROJECT

THE INSTITUTIONAL STRENGTHENING TASK:
EVALUATION REPORT

(Task 4.1.2)

Prepared For

Egyptian Electricity Authority
Cairo, Egypt

and

U.S. Agency for International Development
USAID Mission: Cairo, Egypt
(Contract AID 263-0123.2)

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1. EXECUTIVE SUMMARY

1.1 Evaluation Objectives and Approach

This is the first internally generated evaluation report. It focusses on our performance of the institutional strengthening task (4.1) over the 9/84-12/85 period. The basic objective of the report is to provide to EEA/AID specific evaluation data and assessments that may be used to improve the conduct of this task in 1986. The key concerns for evaluation are effectiveness and efficiency. To what extent did we achieve our objectives? How economically did we use our resources?

The aim of this task is to increase the overall capability of the EEA project team to replicate independently all components of the project. Institutional strengthening is accomplished through (a) on-the-job training and (b) special training, consisting of the conduct of workshops and seminars in both Egypt and the U.S.

1.2 Evaluation Findings

To the credit of all members of the project team, it may be happily stated that training accomplishments have been significant. The initial training needs assessment activity (4.1.1 in the current plan) achieved its basic objectives and put the training program on a sound basis.

The project management team is to be commended for the successful effort to develop a core group of over 60 individuals, including EEA, contractor/subcontractor staff and consultants available to the project on a part- to full-time basis. Training has been provided in all four task areas. Thirteen EEA and host organization personnel have received a total of 31.3 person-months of on-the-job and special training in the U.S. through November, 1985.

These visits to the U.S. have been evaluated in detail and the general consensus is that the on-the-job and special training provided to the EEA trainees in the U.S. has been of above-average to excellent quality, although there remains ample room for improvement in both content and coordination. A full program of special training, including the conduct of eleven workshops and seminars ranging over the field test and supporting analysis task areas, has been presented over the 12/84-11/85 period.

The project has made good progress in stocking the library; to date 45 publications have been shipped to the project office and another 24 have already been ordered.

Also, a full range of audio-visual equipment and supplies, to support training and information dissemination activity, has been delivered to the project office.

In the complicated and time-consuming activity of training

coordination and planning, the project has made considerable progress. The EEA training coordinator has been responsible for coordination in Egypt and has established good working relationships with the USAID/Cairo training offices. The U.S. training coordinator has worked with the contractor and sub-contractor task leaders to coordinate U.S.-based training and has served as a focal point for training communications between the U.S. and Egypt. LBII's liason project manager and training specialist have also made valuable contributions to training coordination and planning, an activity which will continue to require very focused attention in 1986.

1.3 Key Recommendations and Short-Term Actions

On the basis of assessments of effectiveness and efficiency of the training task, the report makes recommendations for improvement and specifies the short-term actions that are required to make progress. Recommendations cover both the on-the-job and special training recommended to be given in 1986 and also suggestions for improving our training system and basic procedures.

2.0 FRAMEWORK FOR EVALUATION

2.1 Purpose of the Report

The key objectives of this report are to (a) document training activity under the institutional strengthening task (4.1), (b) assess the effectiveness and efficiency of that activity to date and, (c) make recommendations towards improving the program. On page 3-131 of the proposal, the training coordinator is required to

evaluate the program and produce periodic reports to EEA, the contractor's management and USAID. Mid-term corrections in on-the-job training will be made as required.

2.2 Overview of Institutional Strengthening

It is useful to remember that the overall goal of the REFTP is to increase the energy problem-solving capability of the GOE by significantly strengthening the capability of the EEA to research, assess, design, develop, and use renewable energy technologies and applications in commercial, industrial, rural, and residential settings.

The aim of the institutional strengthening task is to increase the overall capability of the EEA Project Management Team (PMT) to replicate independently all components of the project. Achieving this objective involves the steady growth on the part of the PMT members in project-related skills and knowledge. It is also important to increase the institutional capability of the PMT to perform and problem-solve in an independent manner. Institutional strengthening is accomplished through (a) on-the-job training (OJT) and (b) special training, consisting of workshops and seminars. These components are conducted in both Egypt and the U.S.

Subjects required to be presented for training under this task include the following, as specified in the contract, Annex A, page 18:

- o engineering analysis of solar thermal, photovoltaic and wind systems;
- o structural analysis;
- o cost engineering;
- o computer simulation of energy system performance;
- o benefit-cost analysis
- o project planning/management;
- o data base management and software;
- o solar energy measurement and instrumentation;
- o industrial process analysis;
- o social analysis and design; and
- o market analysis.

In addition, this task also includes the development of the project library.

2.3 Brief Task History

Before proceeding to the evaluation findings it will be useful to provide in Exhibit 1 a brief history of what has been accomplished to date under the institutional strengthening task. Readers who wish to have a deeper understanding of the requirements, needs, and plans of this task are encouraged to read the recently submitted draft final report, Training Needs Assessment and Recommended Staff Training Plan.

2.4 Objectives and Approach

Our purpose is to provide a comprehensive, mid-term assessment of the overall performance of the institutional strengthening task. By reviewing and assessing the training evaluation data collected through interviews and questionnaires, it is possible to identify the strengths and weaknesses of the overall training system and its major components and basic processes. This knowledge may then be used to improve future training.

2.5 Key Evaluation Concerns

The key concerns for evaluation are task effectiveness and task efficiency. Evaluating for the former involves determining the extent to which the task objectives for this period were achieved. Evaluating for the latter concerns determining how economically and intelligently the human, material, financial and other necessary resources were employed to assure the success of task activities.

The evaluation standards against which the data is to be assessed include the following:

- o contract requirements;
- o proposal requirements, where applicable;
- o annual operating plan (AOP) requirements, and
- o other valid requirements, such as special requests from EEA and/or AID, officially approved memoranda establishing modified training requirements and/or objectives.

Exhibit 1
Brief Task History

<u>ACTIVITY</u>	<u>DATE</u>
Training Needs Assessment Visit by U.S. Training Coordinator (Egypt)	September-October, 1984
Staff Training Plan	November, 1984
English Instruction (Egypt)	November, 1984 to present
Wind Turbine Siting Workshop (Egypt)	December, 1984
Data Collection Seminar (Egypt)	February, 1985
U.S. Training Coordinator's second visit to Egypt	May, 1985
Preliminary Solar Technology Course (Egypt)	May, 1985
Photovoltaic Systems Applications Workshop (Egypt)	May, 1985
Photovoltaic Site Visit Methodology Workshop (Egypt)	May, 1985
Visit of EEA Deputy Chairman to U.S. for Task Area 1	June-July, 1985
Visit of EEA Project Manager to U.S. for Task Area 1	June-July, 1985
Visit of EEA Task Leader for Wind Field Tests to U.S. for field test 3.11	June-July, 1985
Visit of EEA Wind Engineers and General Petroleum Company Engineers to U.S. for field test 3.11	July-August, 1985
Visit of EEA IPH Task Leader, Engineer and General Poultry Company Engineer to U.S. for field test 3.3	July-August, 1985
First Solar and IPH Course for field test 3.3	August, 1985
Visit of EEA Training/Photovoltaics Task Leader to U.S. for field test 3.6	August-September, 1985
Visit of EEA Photovoltaics Engineer and Fish Resources and Development Authority Engineer to U.S. for field test 3.6	September-October, 1985
Technology/Application Options Evaluation and Data Collection and Analysis Workshop (Egypt)	September, 1985
Visits of EEA IPH and Helwan Textile General Manager to U.S. for field test 3.4	October-November, 1985
Second Solar and IPH Course (U.S.) for field test 3.4	October, 1985
Wind Characteristics for Wind Energy Use Seminar (Egypt)	November, 1985
Finding and Evaluating Sites for Wind Energy Use Short Course (Egypt)	November, 1985
Third Visit of U.S. Training Coordinator to Egypt	November-December, 1985
Reverse Osmosis Desalting Technology Workshop (Egypt)	November, 1985

2.6 Subjects for Evaluation

Aspects of the institutional strengthening task to be evaluated below include the following:

- o Initial training needs assessment and plan;
- o Training plan implementation;
- o Training coordination and planning;
- o OJT in Egypt;
- o Special training in Egypt;
- o OJT in the U.S., and
- o Special training in the U.S.

2.7 Period of Evaluation

The overall period for institutional strengthening is 26 months according to the project plan of January 19, 1985. If it is agreed that this task began in October, 1984 as a result of the training coordinator's first visit to Egypt, then this task would run until the end of 1986. The period of evaluation for this interim report is 10/84-12/85. The institutional strengthening task will be evaluated quarterly and an overall evaluation will be conducted at the end of the task.

2.8 Sources of Evaluation Data

In accordance with the evaluation requirements set forth in the proposal, both trainees and trainers have contributed evaluation data. Information has been collected informally, through interviews with EEA and contractor/sub-contractor staff and formally, by administering questionnaires to concerned personnel. A sample questionnaire may be found in Appendix A.

3.0 EVALUATION FINDINGS

The objective of this section is to assess the components of the institutional strengthening task and present evaluation findings. For each activity to be assessed, our approach is as follows: (a) the introductory statement summarizing the basic situation, (b) the statement of the requirement(s), (c) the description of actual performance, including identifying the strengths and weaknesses in these activities, and (d) recommendations for improvement. Section 4 summarizes these recommendations.

3.1 Initial Training Needs Assessment and Recommended Staff Training Plan

This activity in general achieved its basic objectives, putting the training program on a sound basis, and affording considerable learning activities to the EEA team.

3.1.1 Requirement

The contract (Annex A, pp. 17-18) requires an "EEA Staff Training Plan" to cover at least 22 EEA individuals. Subjects to be covered by the plan include those stated above in section 2.2.

3.1.2 Actual Performance

The training coordinators submitted a draft Training Needs Assessment and Recommended Staff Training Plan in November, 1984, covering the training needs of 25 individuals designated to be on the project management team. All were interviewed individually by the training coordinator. Appendix 1 in the above-mentioned report provided information on EEA staff member education, specialization, skills, and training needs, against the background of the intended individual assignment.

In that report, the training coordinators emphasized that OJT is the key element in the institutional strengthening task. OJT covers all task areas of the project and, in the case of the field tests, is presented for each generic subtask. A very detailed recommended approach to the design and conduct of OJT was also included. A subsequent draft of the report, which was completed in early 1985, presented a basic, three-fold strategy to be used for OJT by trainers.

The report also presented a plan for special training consisting of one-two-three day workshops and seminars and other, more extended training events, to be conducted in Egypt and the U.S.

Copies of the report were distributed to all concerned personnel. Although the report has not yet been finally approved, it has nevertheless served as a working guide for training activity. A draft final, updating task requirements and activity,

was submitted to EEA/AID in February, 1986.

3.1.3 Recommendation

For this early training task requirement, there is no recommendation. The work is essentially complete.

3.2 Training Plan Implementation

An impressive accomplishment, from an institutional strengthening perspective, has been the formation and development of a project management team consisting of approximately 60 individuals, including EEA, contractor/ subcontractor staff and consultants available to the project on a part- to full-time basis. Although there are some gaps in the structure of the team, such as the need for EEA economists for supporting analysis and a requirement for additional U.S. engineering support for the resident project manager in-country, this team has been adequately formed. Given the inevitable problems posed by the newness of the project, the shift of responsibility from QHREA to EEA, and the rapid growth in PMT staff, it needs to be stated that the project has made exceptional progress in the last six months and is now carrying out its activities more efficiently and effectively.

Although project delays set back the progress of the training program in early 1985, by mid-year a very ambitious OJT and special training effort began and has continued strongly through the end of the year. Training accomplishments have been significant. Training has been provided in all four task areas. Thirteen EEA and host organization personnel have received a total of 31.3 person months OJT and special training in the U.S. through November, 1985.

3.2.1 Requirements

It was intended that the institutional strengthening task cover the subjects identified in section 3.1.1. More specifically, task leaders and trainers were to offer OJT and special training to support accomplishment of the workplans in all task areas, as stated in the training plan and approved in the annual operating plan (AOP). For the field tests, OJT was to be provided for each of the generic sub-tasks through completion of the statements of work. Special training consists of workshops and seminars whose objective it is to strengthen the PMT by providing supplementary off-the-job training, often in response to an initiative by an EEA task leader. In order to assess special training we need to know first what was planned. Exhibit 2 sets forth special training requirements from revised AOP sub-task statements submitted by the U.S. training coordinator to the resident project manager in May, 1985.

Exhibit 2

Special Training Agenda
(AOP as of May, 1985)

<u>AOP</u> <u>Sub-Task</u> <u>Number</u>	<u>Title</u>	<u>Due Date</u>
4.1.1	Not Applicable	Not Applicable
4.1.2	Not Applicable	Not Applicable
4.1.3	OJT component not applicable but also contained: Data Collection Training	2/30/85
	Economic/Market Data Analysis	Delayed until an approved date could be established
4.1.4	Train-the-Trainer Workshop	7/4/85
4.1.5	Solar Thermal Workshop	5/14/85
4.1.6	Wind Farm Workshop	Delayed until an approved date could be established
4.1.7	Photovoltaics Technology and Applications	5/13/85
4.1.8	Library Development Plan	5/22/85
4.1.9	Organization Development/ Management Planning Visit to U.S. for Project Management	Delayed until an approved date could be established
4.1.10	Managing Complex Renewable Energy Projects Program/ Visit to U.S. for senior task leaders	Delayed until an approved date could be established
4.1.11	Promotional Strategies for Renewable Energy Development Program/Visit to U.S. for EEA training task leader	9/10/85
4.1.12	Training Materials Development	
	Draft Plan for AV materials development	6/14/85
	Obtain Equipment	6/19/85
	Film Site Visits	(Depended on new dates for site visits)

3.2.2 Actual Performance

3.2.2.1 Assessment of Special Training Implementation (AOP)

In judging the status and progress of the institutional strengthening task, it is important to remember that OJT and special training activities did not begin in earnest until May, 1985.

What, then, has been accomplished? First, using the events and activities presented in Exhibit 2 as requirements, it is clear that the project staff accomplished all requirements on time for:

- o the Data Collection Seminar (4.1.3)
- o the Solar Thermal Workshop (4.1.5)
- o the Photovoltaic Technology and Applications Workshop (4.1.7)

The status of the remaining events and activities is as follows:

- o Train the Trainer Workshop (4.1.4). The U.S. training coordinator's memo of January 15, 1986 suggested that this workshop not be given until the EEA designates a part-time training team. To date there has been no response to the request.
- o Wind Farm Workshop (4.1.6). Originally intended to be a presentation to EEA engineers in support of Field Test 3.11, grid-connected wind farm, this workshop has not yet been conducted. Instead, the more timely courses -- Wind Turbine Siting Workshop, Wind Characteristics for Wind Energy Use, and Finding and Evaluating Sites for Wind Energy Use -- were presented. The latter two courses presented introductory material on wind farms. The U.S. wind task leader recently stated that the workshop ought to be scheduled for the fall of 1986, in order to assist EEA engineers to better evaluate the proposals for FT 3.11.
- o Library Development Plan (4.1.8). A draft library development plan was submitted to the EEA training coordinator for comment in August, 1986. A formal draft for comment was submitted to EEA/AID in November, 1985. The AID/Cairo librarian reviewed the draft; her comments were received at LBII in mid-February, 1986. LBII is now at work on a revised report.

Good progress has been made in outfitting and stocking the library. To date, 45 publications have been shipped to the project office, another 24 have already been ordered and 16 have been requested to be ordered. In addition, many relevant newsletters and magazines are regularly delivered to the library in weekly pouches. Many more publications and learning aids of all types

will be delivered to the library in the coming year in response to initiatives from both EEA task leaders and U.S. experts.

In November, 1985 the training coordinators held a library development meeting in Cairo and agreed to take certain planning and staffing actions that were specified in the U.S. training coordinator's memo of January 8, 1986. To date there has been no substantive response to that memo from the project office. Library planning and staffing appears temporarily stalemated but will soon be given more attention.

- o Organization Development/Management Planning Visit (4.1.9). The visit of the EEA project manager to the U.S. occurred in June-July, 1985. Although he did not participate in a "one-month academic program in organization development and management planning" that was originally contemplated, his visit nevertheless did fulfill some of the intended general requirements set forth in the AOP, such as visits to public and private renewable energy organizations, and discussions with high-level officials.
- o Managing Complex Renewable Energy Projects Program (4.1.10). This program/visit to the U.S. was intended to increase the management skills of EEA task leaders and senior managers. Although the intended personnel did visit the U.S. in June-July, 1985, their participation in project management work and field test activity did not allow them to receive this training. The IPH task leader did receive useful training in time management and project planning at LGE. It is still an excellent idea, however, and will receive attention in the section on recommendations.
- o Promotional Strategies for Renewable Energy Development Program (4.1.11). This program was intended to introduce a core information dissemination team, consisting of the training/information dissemination task leader and another designated individual, to the design, development, implementation and evaluation of promotional strategies for renewable energy development and education. Because of the EEA training coordinator's photovoltaic and training commitments during her August-September 1985 visit to the U.S., she was not able to receive this training. In hindsight, it is perhaps safe to say that conducting this program was somewhat premature. It is perhaps better placed within the framework of the 4.2 information dissemination task.

- o Training Materials Development (4.1.12). This sub-task is intended to produce a range of audio-visual materials to support training and information dissemination. To a certain extent, this sub-task has been accorded a lower priority because of the delays in field test implementation. An important objective is to produce a video film history of the field tests. Towards that end, an edited video on the site visits for field tests six and seven has been submitted to the U.S. training coordinator. At the appropriate times, the project will video photograph all identified sites prior to the beginning of construction/installation work. In addition, the U.S. training coordinator has requested the U.S. experts to document their project activities on 35mm film and has been collecting the slides for proper organization and delivery to the project office.

The following equipment to support this sub-task has been delivered to the EEA:

- o video camera/case;
- o video recorder/case;
- o video TV/monitor;
- o box of blank video tapes;
- o tripod for video camera;
- o rolling cart for video transport/storage;
- o 35mm camera (single lens reflex)/case;
- o camera bag with accessory equipment;
- o zoom lens for 35mm camera;
- o flash attachment for 35mm camera;
- o 35mm slide projector with cassette recorder and built-in viewing screen;
- o projection screen for slide/movie shows;
- o 35mm film for camera;
- o slide viewing device, and
- o plastic envelopes for storing slides.

In addition, the following equipment for visual presentations has been delivered to the EEA:

- o portable presentation board/case;
- o cork bulletin board, and
- o white magnetic writing board.

3.2.2.3 Other Special Training

In addition to the AOP-based special training presented during this period, the project featured the following events, which were designed in response to special requests or initiatives by EEA and U.S. task leaders, including Battelle's participation in task area #5.

- o English instruction for EEA staff expected to visit the U.S.;
- o Wind Turbine Siting Workshop;
- o First Solar and IPH Course;
- o Second Solar and IPH Course;
- o Wind Characteristics for Wind Energy Use Seminar;
- o Finding and Evaluating Sites for Wind Energy Use Short Course;
- o Reverse Osmosis Desalting Technology Workshop, and
- o Technology/Application Options Evaluation and Data Collection and Analysis Workshop.

3.2.2.4 Current Special Training Needs

Evaluation data available to the training coordinators highlight the need for special training, as described below.

Given the relatively short time period in which the growth and organization of the PMT has effectively occurred, it should be stated that significant progress has taken place in achieving task and sub-task aims. These activities include the completion of the first Annual Operating Plan and Project Plan; the development and frequent updating of the sub-task plans in all task areas; the establishment of procedures for project management, administration, and reporting; the conduct of supporting analysis; the completion of significant sub-tasks under the field test components, implementation of an intensive program of OJT in the U.S., and the beginning of special training in Egypt and the U.S.

3.2.2.4.1 Project Management

To date special training in this important subject has been limited to LGE Solar and IPH Technology courses which offer highly rated units on project planning and time management. This special training has been received by five EEA and host organization personnel to date. It is expected that this course will be presented three more times.

3.2.2.4.2 Supporting Analysis

To date special training provided under this task area has consisted of the data collection seminar in February, 1985, the introductory computer operations workshop in August, 1985 and the technology/applications options evaluation and data collection and analysis workshop in September, 1985. This is a good beginning but more needs to be done.

Of the utmost importance is special training in computer operations, computer programming, software applications and management information systems, all in support of the renewable energy information system (2.3) task, and, to a lesser degree, the project management task area (1.0). Following the presentation by

LBII's Mark Pape of a computer operations workshop in Cairo, a plan was developed to provide a three-level program of special training in computer operations and was submitted to the resident project manager in November, 1985 but was never implemented due to the delays caused by the change in EEA and MC REIS task leaders. At present a new round of discussions and planning is taking place and suggestions for targeted training for REIS will soon be forwarded to the EEA.

Under the same task area, LBII's Seyoum Solomon presented a data collection seminar in February, 1985 for task 2.1. Data collection workbooks were delivered to the EEA in July, 1985. Both the continuing activity in data collection and the availability of these practical manuals would appear to offer an opportunity for more data collection training for EEA staff. At present, however, there do not appear to be staff assigned to this task. Such training could be designed and presented if personnel were assigned and actively involved in the task.

There is also a need to provide training in the area of economic and market analysis (2.2). An economic analysis seminar is to be held in late spring or early summer.

3.2.2.4 Field Tests

As the overall program of training for the field tests got underway, field test task leaders realized that more training would be highly useful, especially for the junior engineers. The EEA IPH task leader requested LGE to design and conduct a series of five, 40-hour Solar and IPH Technology courses, two of which have been presented. Both the EEA IPH task leader and the U.S. training coordinator attended the first course and noted the high quality of course material and presentations. The EEA task leader also provided very useful suggestions on the course which were incorporated into the conduct of the second course.

Both the PV and Wind Task leaders have requested similar special training for their teams for FY 86 including the following:

- o PV Conceptual Design Workshop;
- o PV Pump Selection, Installation, and Monitoring;
- o Economics of PV Systems;
- o State-of-the-Art Wind Energy Technology for Egypt;
- o Wind Energy for Rural Applications;
- o Renewable Energy Hybrid Systems; Wind/PV, and
- o Desalting Technology Workshop.

The contractor and sub-contractors will soon be suggesting to the EEA the curricula, schedules, and locations for covering this program of special training.

3.2.3 Recommendations

Recommendations for improvement of training plan implementation are as follows:

- o Train-the-Trainer Workshop (4.1.4). Conduct this workshop in Cairo at a time convenient to EEA following the designation by EEA training team members, in accordance with the U.S. training coordinator's memo dated January 15, 1986.
- o Wind Farm Workshop (4.1.6). It is recommended that the wind field test task leaders formulate workshop objectives, curriculum, audience, and schedule for this workshop during the U.S. wind task leader's next trip to Egypt.
- o Library Development Plan (4.1.8). It is suggested that LBII recruit a short-term consultant librarian to assist in drafting the final report and provide a short-term action plan of development and training appropriate to the needs of the project library. The draft final will be due in Cairo May 1, 1986.
- o Managing Complex Renewable Energy Projects Program (4.1.10). It is suggested that at least two EEA task leaders/senior engineers attend the six-week project and program management course described in the U.S. training coordinator's memo dated February 24, 1986. Although the program itself does not focus specifically on energy projects, the skills and knowledge to be gained from this program will fulfill the original requirements of this sub-task. It is particularly important to move quickly to assure this opportunity for EEA.
- o Promotional Strategies for Renewable Energy Development Program (4.1.11). It is recommended that this program be conducted as part of the activity of the training/information dissemination contractor to be selected as a result of task 4.4. LBII will begin to provide introductory materials and publications as useful background to the upcoming information dissemination task.
- o Training Materials Development (4.1.12). It is suggested that LBII will provide to EEA a plan by May 1, 1986 for audio-visual materials development. It is likely that suggestions will be made to the effect that the bulk of the work will be accomplished through the training/information subcontractor. However, preliminary training in the use of the video and 35mm equipment already delivered to the EEA will be provided by LBII prior to the start-up date of the new contractor.

- o Project Accounting/Finance. In addition to the training recommended to be provided to EEA task leaders/senior engineers, it would be useful for the office and project accountants to receive specialized training in project accounting and finance. The U.S. training coordinator will research suitable opportunities and forward options in a memo.
- o REIS. It is suggested that LBII/MC forward a recommended REIS training plan for consideration/approval of EEA.
- o Data Collection Workbook. It is suggested that the data collection document delivered to EEA in July, 1985 constitutes an excellent resource for training of EEA data collection staff. LBII will request Seyoum Solomon to work with the supporting analysis task leaders to devise a strategy for its use.
- o Field Test Special Training. Approximately seven special training events have been requested by the EEA PV and wind task leaders to be conducted in FY 86. It is suggested that the U.S. field test task leaders develop a plan that includes these subjects in training to be conducted in Egypt and the U.S. and forward it to EEA for review/approval.

3.3 Training Planning and Coordination

Planning and coordinating the training task is a complex and time-consuming activity involving the cooperative efforts of training personnel at EEA, AID, PARTNERS, the contractor, the sub-contractors, and host-organizations. Doing a good job in training takes more effort than is commonly thought. The process consists of identifying opportunities, selecting personnel, developing training packages, obtaining approvals for visitors, arranging itineraries and schedules, making arrangements for accommodations and travel, conducting the training, visiting sites, troubleshooting any problems that occur, monitoring, and debriefing. While we have made considerable progress in planning and coordinating the training program to date, it is clear that more attention and resources should be devoted to this activity.

3.3.1 Requirement

While the contract does not specifically address coordination and procedures, the proposal sets forth these relevant directives:

The Training Coordinator will orient all concerned task managers and key technical personnel in how to integrate training functions with practical experience. This will take the form of:

- (1) a guideline document setting out general practices and procedures; and
- (2) individual meetings with involved persons to orient them to the training functions.

3.3.2 Actual Performance

The situation to date was summarized in a recent memo to Robert Spongberg, January 15, 1986.

As you know our training task (institutional strengthening 4.1) has been particularly active since June, 1985. In the on-the-job training component, 13 EEA PMT members and host organization personnel have visited the United States to date with many more projected to come in 1986. Under special training at least eight workshops/seminars/ courses have taken place to date in Egypt and the U.S., with a full program anticipated this year. To date, the coordination and planning for both activities have been somewhat inefficient, causing duplication of effort and spending of scarce budget resources. In general the reasons for this include: a) lack of direction, b) a gap in communications, and c) insufficient personnel resources. The objective of this memo, then, is to present recommendations for improving training coordination and planning.

3.3.3 Recommendations

It is suggested that the recommendations in the U.S. training coordinator's memo of February 12, 1986 be implemented. They include the following:

- o Adopt now the basic steps for OJT and special training (outlined in the memo) as guidelines for purposes of coordinating and planning training in the short-term.
- o Produce a refined version of these basic steps to be incorporated into the training section of the project manual.
- o Clearly identify the EEA training coordinator as the person with primary responsibility for OJT and special training activity.
- o Recruit a junior trainer to assist the training coordinator to manage the enlarged scope-of-work that this memo envisages.

- o Develop a training team.

- o Train the team.

3.4 OJT in Egypt

There has been considerable opportunity for OJT in Egypt and, in general, it has been conducted informally.

3.4.1 Requirements

The requirements for OJT in Egypt are set forth generally in section 3.1.2 above. The U.S. training coordinator's memo of January 15, 1986 establishes procedural requirements for OJT.

3.4.2 Actual Performance

In Egypt, on-the-job training for the field test task has occurred when the U.S. experts have visited Egypt for periods of roughly 3-5 weeks per trip, about 4 or 5 times during the past year. Training has consisted of joint EEA-US team preparation for site visits; conduct of site visits; evaluation of site visits; and subsequent sub-task planning. In addition, U.S. field task leaders have worked informally with EEA engineers to introduce the use of relevant software packages, including wind energy resource and word-processing software. Finally, field test teams worked together to develop the first AOP and PP.

In the supporting analysis task area (2.0), on-the-job training has included joint efforts to collect data for the field-tests, limited informal instruction in computer operations, working group sessions to develop the draft plan for the renewable energy information system (REIS), and collaborative activity for the renewable energy applications assessment sub-task.

In the training/information dissemination task area (4.0), on-the-job training has included an extensive program of jointly conducted EEA PMT training needs assessment, and working sessions to develop and implement the recommended staff training plans, the annual operating plan, and project plan. In addition, the training coordinators jointly researched and assessed education and training resources for the project in and around Cairo.

3.4.3 Recommendations

It is recommended that prior to arrival in Egypt, U.S. experts communicate intended on-the-job training activity to their EEA counterparts for review and approval. Objectives, content, audience, location, scheduling and evaluation are the basic factors to be considered. The U.S. training coordinator will assist the U.S. task leaders in this effort.

3.5 SPECIAL TRAINING IN EGYPT

Considerable special training has been conducted in Egypt covering all four task areas. EEA task leaders have taken positive initiatives to get the program underway. Nine special training events have taken place. This is a good start. Many more subjects remain to be presented in 1986.

3.5.1 Requirements

The subjects generally to be covered are listed above in section 1.3. The U.S. training coordinator's memo of January 15, 1986 establishes procedural requirements for special training.

3.5.2 Actual Performance

The project has featured an impressive list of special training events in Egypt, including:

- o English Instruction. The EEA training coordinator initiated a program in November, 1984. It is funded by USAID and takes place at the American University of Cairo. The objective is to prepare EEA PMT members to work effectively in the U.S. This program has worked well to date but more specific evaluation data remains to be collected.
- o Wind Turbine Siting Workshop. This was conducted satisfactorily by Battelle staff and the EEA wind task leader in December, 1984. Evaluation data will be collected.
- o Data Collection Seminar. Presented by LBII's Seyoum Solomon, this seminar took place in February, 1985. Dr. Solomon's report of April 16, 1985 on the seminar stated that:

All of the respondents found the course material useful. Most indicated their interest in learning more statistics and economic analysis, which was beyond the scope of the Data Collection Seminar.

Participants filled in seminar evaluation forms which are now in the possession of the EEA training coordinator.

A data collection workbook resulted from this seminar and copies have been forwarded to the project office.

- o Preliminary Solar Technology Course. This seminar was offered in May, 1985 by Dr. Anhar Hegazi with the participation of the LGE engineers. Evaluation data will be collected for this event.

- o Photovoltaic Systems Application Workshop.
- o Photovoltaic Site Visit Methodology Workshop. MC engineers presented these workshops in May, 1985. Evaluation data will be collected for these events.
- o Technology/Application Options Evaluation and Data Collection and Analysis Workshop. This was conducted by Dr. Hegazi and MC engineer Dr. Anil Cabraal in September, 1985. Evaluation data will be collected for this event.
- o Wind Characteristics for Wind Energy Use Seminar.
- o Finding and Evaluating Sites for Wind Energy Short Course.

These events were presented by Dr. Bassyouni and the Battelle wind team of David Renne and Bernard Holst in November, 1985. The U.S. training coordinator informally assessed the one-day seminar in a report November 11, 1985 stating that

in general, the Battelle staff made an excellent presentation that was much appreciated by the EEA and important guests.

- o Reverse Osmosis Desalting Technology Workshop. This half-day workshop was presented by MC consultant Bruce Watson in November, 1985. Evaluation data will be collected for this event.

3.5.3 Recommendations

It is recommended that the EEA document and evaluate its experience with the program of English instruction for EEA project staff. The U.S. training coordinator will contribute the evaluation research design and provide other related technical assistance.

In addition, LBII should develop more detailed evaluation data and assessments for these seminars and workshops mentioned above in section 3.5.2, with the exception of the data collection seminar, for which we have such data.

The U.S. training coordinator will also draft and forward to the EEA counterpart a questionnaire to be used to collect evaluation data for the special training events conducted in Egypt.

3.6 OJT and Special Training in the U.S.

A considerable amount of OJT and special training has been conducted in the U.S. It has been judged to be generally of above average effectiveness. An expanded program is planned for FY 86.

3.6.1 Requirements

Extensive planning for these visits has been the standard. U.S. and EEA task leaders and training coordinators jointly discuss and produce programs/itineraries for ultimate EEA approval. These programs typically include OJT, site visits, and short-course components.

3.6.2 Actual Performance

OJT and Special Training in the U.S. have been subjects of extensive formal evaluation by both the EEA PMT and the U.S. task leaders and training coordinator, all of whom have provided training evaluation data in various questionnaires, from which the following is derived.

Comments provided in the following sections are drawn from trainee comments, which have been paraphrased by the writer in order to preserve confidentiality of respondents.

3.6.2.1 Achieving Visit Objectives

Most of the respondents achieved all or nearly all of their objectives for these training visits. Trainees provided these comments and suggestions:

- Insufficient time on the computer (3.4).
- Needed more time to do the conceptual design, project more complex than originally thought (3.6).
- Interaction of personnel is required for effective conceptual design work (3.6).
- Should have more time to visit the companies and to talk with company personnel (3.6).
- Effective conceptual design training should include preparatory course for the junior engineers (3.6).
- Not enough time to achieve the objective at Battelle (3.11)
- The program should have included a visit to a machine manufacturer (3.11).
- Conceptual design was not fully finished due to time limitation (3.3).

3.6.2.2 Best Parts of the Visit

These included the following:

<u>IPH</u>	<u>PV</u>	<u>Wind</u>	<u>Other</u>
-Computer course (F Chart - Lotus 1,2,3)	-Turbo Site Visit (Mass.)	-Training at MC	-Applications assessment work
-IPH training	-Solarex Site Visit (Maryland)	-Working with MC	
-Discussions with LGE experts		-AWEA Conference Attendance	
-Solar Energy Site Visits	-Mobil Solar Site Visit (Mass.)	-Wind Farm Visit (California)	
-IPH Course			
-Technology Review work	-Conceptual design process		
-Application Review work			

3.6.2.3 Least Satisfactory Aspects of the Program

These included the following:

<u>IPH</u>	<u>PV</u>	<u>Wind</u>	<u>Other</u>
-Not interested in the economics course	-Visit to Solarex too short	-Limited time for Battelle training	-Training visits limited
-Some days were too busy to absorb all the material	-Overall time for visit too short to accomplish work		-High costs of living
-Not enough time to finish conceptual design	-Site visits not appropriate to intended projects in Egypt		-Needed to resolve some aspects of training management

3.6.2.4 Overall Quality of OJT Received During the Visit

Of nine respondents, two rated OJT "excellent," six rated it as "very good," and one rated it "good." None rated it "fair" or "poor." Respondents' comments and suggestions included the following:

- Need more training on computer for conceptual design (3.4).
- Classroom work for the juniors would be good (3.6).
- People need hands-on education and training (3.6).
- Need texts in refrigeration (3.6).
- More sub-contractor specialists should support and participate in the conceptual design training (3.6).
- Increase the OJT time (3.11).
- Use a computer program to determine the heat and energy balance (3.3).

3.6.2.5 Quality of Course Presentations by Staff

Of nine respondents, two rated the quality of staff presentations "superb," six rated it "very good," and one rated "good." None rated it "routine" or "poor." Comments and suggestions are as follows:

- Recommend more in-depth training in solar thermal and photovoltaics (3.4).
- Present formal classwork in conjunction with OJT (3.6).

In addition, the IPH task leader submitted to LGE a separate evaluation of the first solar and IPH technology course. LGE trainers found the report very useful and incorporated its comments into design and planning of the second course.

3.6.2.6 Quality of Teaching and Materials Used in Courses

Of seven respondents, three rated the quality of teaching materials as "excellent," three rated it "very good," and one rated it "good." None rated it "fair" or "poor." Respondents' comments and suggestions included the following:

- Received several books about the subject (3.4).
- Few books in my field (refrigeration) (3.6).
- The technology reference notebook was good and helpful.
- More detailed information on the design and control of wind generators would be useful (3.11).
- Teaching materials were well prepared (3.3).

3.6.2.7 Usefulness of Site Visits

Of ten respondents, four responded "extremely useful," another four responded "very useful," and two responded "useful." None rated it "somewhat useful" or "useless." See separately submitted task leaders' reports on site visits (3.3, 3.6) for additional information. Comments and suggestions included:

- Bad weather made the site visits less useful (3.4).
- Would be useful to see different applications of the same technology (3.4).
- Site visits gave us information about technologies, applications, equipment marketing, cost comparisons, and research and development (3.6).
- The site visits require more time; 2-3 hour per site visit is not enough (3.6).
- State the objectives of the site visit at the outset (3.6).
- Visit sites generally similar to those featured in our project in Egypt (3.6).
- Increase wind farm site visits (3.11).
- Florida solar energy center in Cape Canaveral is recommended for visit (3.3).

- Site visits gave us useful information on management, maintenance, operations, monitoring, and cost (3.3).
- Visit sites more closely related to our projects in Egypt (3.3).
- In some sites operation/performance data were not available, which makes it difficult to judge the practical feasibility of such projects (3.3).
- Chairman and Deputy Chairman might be interested in making this tour (wind farm) (3.11).

3.6.2.8 Quality of Travel Arrangements

Of ten respondents, five rated the quality of travel arrangements "excellent" and five accorded a rating of "very good." None rated "good," "fair" or "poor." See also task leader's separately submitted comments on IPH site visit program (3.3), for additional information. Comments and suggestions included the following:

- Low cost of living in Spartanburg (3.4).
- Good arrangements for accommodations and travel (3.6).
- U.S. personnel were generous (3.6).
- To save time and money, allocate a car to counterparts (3.6).
- Increase per diem (3.6).
- Increase amount of advance cash (3.6).
- Good arrangements/hospitality/meetings (3.11).
- Thanks for the travel arrangements (3.11).
- LBII, Amideast and AID/Washington made everything easy (3.3).
- Thanks for travel arrangements and hospitality of personnel (3.3).
- Detailed programs should be designed and sent to Cairo 2-3 weeks prior to trainee travel, to facilitate adequate routing and budgeting (3.3).
- The REFT project should arrange for the internal business transportation at areas lacking public transportation such as Spartanburg, South Carolina and Virginia. This should not be based upon personal initiatives of the U.S. staff (3.3).

3.6.2.9 Quality of Accommodations

Of nine respondents, three rated the quality of accommodations "excellent," while five rated it "very good," and one rated it "good." None rated it "fair" or "poor." Comments and suggestions included the following:

- Excellent in Spartanburg; very expensive in the big cities (3.4).
- Good but expensive (3.6).
- Very expensive in comparison with the per diem (3.11).

- The per diem for the period in San Francisco was not enough because the hotel room rate was more than the daily per diem. (3.11).
- LBII and LGE helped me to get good accomodations at a reasonable price and location (3.3).
- I feel that motels containing kitchen facilities may be better for the participants (3.3).
- Accomodations should be in a lively area, preferably with cooking facilities (3.6).
- Very expensive (3.11).

3.6.2.10 Helpfulness of Contractor/Subcontractor Personnel

Because respondents had experience on these OJT visits with more than one contractor, the total number of responses for this category was much higher than for the others. Of a total of 25 responses, 20 were in the "extremely helpful" category and five in the "very helpful" category. There were no responses in the "helpful," "minimally helpful," and "not helpful" categories. Many of the DEA trainees expressed their thanks for assistance rendered by the task leaders and training staff.

3.6.2.11 Recommendations

It is suggested that the contractor/subcontractor task leaders/trainers review the findings of this section and incorporate the most important ones into their future training activity. The U.S. training coordinator will shortly be contacting them in order to offer assistance if required.

It is also recommended that, especially in the case of special training, contractors and subcontractors provide at least one person per training event to sit in during the training event and provide evaluative comments, written and oral, to the training staff after completion of the event. The U.S. training coordinator should provide a briefing on evaluation methods to the designated individual.

4.0 RECOMMENDATIONS AND SHORT-TERM ACTIONS

The objective of this section is to summarize and put into checklist form the general recommendations and specific short-term actions to implement them. These are provided in Exhibit 3.

Exhibit 3

Recommendations and Short-Term Actions

<u>Section (Report)</u>	<u>Title</u>	<u>Recommendation</u>	<u>Action</u>
3.2.3	Train-the Trainer Workshop (AOP/4.1.4)	Conduct Workshop.	EEA should form training team in accordance with Jan. 15, 1986 memo.
3.2.3	Wind Farm Workshop (4.1.6)	Conduct Workshop.	Wind task leaders to formulate objectives, program, audience, schedule, during upcoming visit.
3.2.3	Library Development Plan (4.1.8)	Provide EEA with short-term action plan for staffing and development.	Submit draft final report by May 1, 1986.
3.2.3	Managing Complex Renewable Energy Projects Program (4.1.10)	Meet the original requirements of this subtask by enrolling at least two EEA task leaders in a summer 1986 U.S. program.	EEA should designate personnel, in accordance with Feb. 24, 1986 memo.
3.2.3	Promotional Strategies for Renewable Energy Devel- opment Program (4.1.11)	Delay the conduct until after training/informa- tional dissemination subcontract is awarded.	Provide introductory promotional materials to EEA for familiarization purposes. Also, incor- porate this program into project paper 4.2.
3.2.3	Training Materials Development	Do some of the work now, the rest under the subcontract.	Deliver audio-visual materials plan to EEA by May 1, 1986.
3.2.3	Project Accounting/ Finance	Provide U.S.-based training in project accounting and finance.	Provide programs in memo to EEA by May 1, 1986.
3.2.3	REIS	Reformulate the REIS training program and schedule.	LBII and MC to deliver new REIS training plan to EEA by May 1, 1986
3.2.3	Data Collection Workbook	Use the workbook to train EEA staff.	LBII and EEA to devise a strategy for its use by April 20, 1986.
Field- test Special Training	Recently requested PV and Wind Special Training	Conduct as many of these subjects as possible in Egypt and the U.S.	LBII to consult with sub- contractors to develop and deliver plan for conduct to EEA by May 1, 1986.

Exhibit 3

Recommendations and Short-Term Actions

(continued)

3.3.3	Training Planning and Coordination	Implement recommendations in February 12, 1986 memo	EEA should respond to memo.
3.4.3	OJT in Egypt	Provide information on intended OJT programs to EEA with sufficient time for EEA to respond and contribute to program design and conduct.	Communicate this request to U.S. trainers and provide technical assistance as requested.
3.5.3	Special training in Egypt	To the extent possible, conduct all special training events listed in Exhibit 6 of the Training Plan Report.	Request the appropriate task leaders to develop the necessary programs and schedules to assure this.
3.6.2	OJT and Special Training in the U.S.	Incorporate the lessons learned from this evaluation into future training.	Disseminate the results to U.S. task leaders and trainers and provide technical assistance as required.

6. What was the best part of your program? Why?

7. What was the least satisfactory part of your program?

8. How would you rate the overall quality of the on-the-job training you received? (Circle one.)

Excellent Very Good Good Fair Poor

Comments and Suggestions:

9. How well did the education and training staff present the courses or subject matter you were intended to learn?

Superbly Very Well Well Routinely Poorly

Comments and Suggestions:

10. Please rate the quality of teaching materials used in your course or training.

Excellent Very Good Good Fair Poor

Comments and Suggestions:

11. How useful to your program were the site visits?

Extremely Very Useful Somewhat Useless
Useful Useful Useful

Comments and Suggestions:

12. Please rate the quality of your travel arrangements.

Excellent Very Good Good Fair Poor

Comments and Suggestions:

13. How were your accommodations?

Excellent Very Good Good Fair Poor

Comments and Suggestions:

14. How helpful were key personnel from the contractor, subcontractor, and significant organizations?

LBII

MC

LGE

E³I

Please Name
Other Other

Extremely
Helpful

Very Helpful

Helpful

Minimally
Helpful

Not Helpful

Comments and Suggestions:

15. Use this space to continue your comments or to provide important information not requested above.