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**SCIENCE AND TECHNOLOGY
COOPERATION PROJECT**

MID-TERM EVALUATION

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ACKNOWLEDGEMENT

Any evaluation relies heavily on the cooperation and understanding of the organization, and individuals in it, who are the subject of the evaluation. That understanding, let alone cooperation, are not to be taken for granted.

In this case the understanding and cooperation of Dr. Samih Nokrashy and his staff were outstanding -- indeed, well "above and beyond the call of duty." They not only took hours of their crowded time to talk to us and made their documents available to us immediately on request, they arranged most of our appointments for us and, most importantly, provided critical guidance to us based on our expressed needs. The professional give-and-take was highly rewarding both personally and professionally. We are grateful.

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PREFACE

The attached evaluation report, concerning the S & T Cooperation (STC) Project being funded by USAID/Cairo, was prepared by Development Associates Inc., in conjunction with its mid-term evaluation of USAID/Cairo's \$136.75 million Science and Technology for Development (STD) program. It is one of a series of five individual evaluation reports prepared concurrently by Development Associates for the five component projects of the STD program, which included the following:

Project Number	Project Name	LOP Amount (\$mill.)
263-140	S&T for Development (Start-Up) Includes Phase I - Start-up component	136.75 3.00
263-140.1	S&T Cooperation	36.00
263-140.2	Schistosomiasis Research	39.65
263-140.3	Energy Conservation and Efficiency	49.50
263-140.4	Energy Manpower Development	8.60

Participants in the evaluation exercises included expatriate as well as Egyptian S&T specialists, as indicated on the cover sheets of the individual reports. Specialists in the design and implementation of U.S. AID projects and programs were also involved. The Chief of Party for the overall evaluation effort was Mr. Donald Dembowski.

LIST OF ACRONYMS

AID	Agency for International Development
ASRT	(Egyptian) Academy of Scientific Research and Technology
ATP	Advanced Technology Program
CAD & E	Computer Aided Design and Engineering
CEO	Chief Executive Officer
CMRDI	Central Metallurgical Research and Development Institute
EGYPTALUM	The Egyptian Aluminum Company
ENSTINET	Egyptian National Scientific & Technical Information Network
ERI	Electronic Research Institute
FY	Fiscal Year
GOE	Government of Egypt
GOFI	General Organization for Industrialization
IESC	International Executive Service Corps
LE	Egyptian Pound
LOP	Life Of Project
LRP	Local Research Program
NARP	National Agriculture Research Program
NRC	National Research Center
NRP	National Research Program
PACD	Project Assistance Completion Date
PI	Principal Investigator
R&D	Research and Development
RD &E	Research Development and Engineering
RFP	Request for Proposal
S&T	Science and Technology
SC	Steering Committee
STC	Science and Technology Cooperation (program)
STD	Science and Technology for Development (program)
TLO	Technical Liaison Officer
UL II	University Linkage Program II

EXECUTIVE SUMMARY

As one of four inter-related projects designed to build on past work, the Science and Technology Cooperation (STC) project was designed to strengthen Egypt's capacity in science and technology and to put that enhanced capacity to work in support of priority development goals. The STC project is targeted specifically on a limited range of industrial applications, including the high-tech areas of microbiology and computerization, and two or three environmentally-linked types of local and regional projects.

The leit-motif of this project is forging or enhancing linkages between the S & T sector, in a Research, Development and Engineering mode rather than at the level of basic research, and potential users -- "end-users" -- of RD & E applications in industry and in local government. Thus the project design requires the identification and participation of an end-user for every R&D grant to be funded under the project. Ideally -- and in many cases this is happening -- projects should be proposed by the end-user in the first instance.

For several reasons, now overcome, the project was slow in getting started. Although the Project Agreement had been signed in 1987, the first research grants were not awarded until January/February 1990. Thus, operations under this project had only been going on for a little over two years at the time of this evaluation (March 1992). (The PACD is September 30, 1995.) As of this time 33 research projects have been funded for a total US contribution of LE 7,208,804 (roughly US \$2,178,000 at the present exchange rate) and US \$3,116,492 out of the US \$36.0 million authorized project funding. Only one or two research projects had been completed; most were in mid-stream or in the early stages of execution.

Nevertheless, the team was well impressed by what it saw. STC,¹ the GOE agency set up to carry out the project, is a lean operation with well-qualified staff and high staff morale. Project procedures, set up by a U.S. consultant working with STC, are well thought out and appear to be working well (although we think they can be refined somewhat, given two years of experience).

The project, thanks to good management and a willingness to adapt and experiment, seems well-launched towards the accomplishment of its major objective: "selling" the R&D approach to the Egyptian industrial and local government sectors and thus helping to reinforce or forge links between the R&D community and those two sectors. STC is going about this through an imaginative variety of methods in addition to just funding end-user endorsed research grants (which constitute its basic program). It also is using newsletters, the media, and workshops and seminars that bring together researchers and potential end-users to carry out this basic purpose. The seminars particularly appear to be a very promising medium. The

¹"STC" is the shorthand title of both the project being evaluated, Science and Technology Cooperation, and the Egyptian agency charged with implementing it: The Science and Technology Cooperation Secretariat. Unless this report specifies the "STC Project" or "The STC Program," the initials "STC," as used herein, refer to the Secretariat.

role of the Technical Liaison Officers (TLOs) -- the "extension agents" of the "R&D philosophy" -- also needs to be mentioned in this connection. This seems to be working.

Inevitably, we have found some areas in which some reexamination of original project design seems called for and some in which some tightening up is indicated. Among the latter we would mention procurement and sub-project disbursement procedures. The Team also recommends more attention be paid to the need for well-designed socio/economic studies in the local/regional development projects and to the inclusion of the results of those studies into the design of the final products coming out of the R&D process. The Team also has some questions regarding the small industry segment of the project. STC's approach, the "incubator" project in 6th of October City, needs a whole series of supporting activities -- finance, management training, technical assistance -- to be viable. These other essential elements are beyond STC's competence and beyond its organizational capacities. While STC's demonstration projects can be central to the success of an effort to promote small industries, STC itself should not be the one to attempt to put this complex package together or administer it.

With respect to project design, we think consideration should be given to expanding the number of priority sectors set out in the project paper and endorsed by the STC Steering Committee. Although there was a very good reason for starting this project off with a restricted scope, we think the basic approach has proven itself sufficiently well so that a somewhat more ample scope may now be justified.

The most basic question of all, of course, is: What will happen when the AID funding for this project runs out in 1996? Our basic answer is, AID should keep its options open. It is too early to say that this project is a success. It is not too early to say that this project appears to be basically well designed and, despite early delays in implementation, well launched. It also probably is not too early to say that we foresee that the STC Secretariat will need to continue beyond the end of U.S. Fiscal Year 1995. Should the next scheduled evaluation of this project (contemplated for June 1994) indicate that this project is succeeding in bringing the industrial sector and local government together with the country's installed and growing R&D capacity, to their mutual benefit, a judgement on a further AID role can be taken then.

Meanwhile, however, STC and AID must start thinking now about the eventual financial sustainability of STC. There are several measures that can be taken now, and several others that might be worth considering that could significantly enhance STC's chances of living on its own income. Among the former is a concerted attempt to get end-users to pay more of the local currency costs of the research contracts of potential value to them. Such contributions to research costs might be enhanced by the introduction of a "result guarantee" system under which a loan would be extended to an end-user for its share of research costs, to be paid back over time if the research produces a commercially viable product or process or to be converted to a grant if nothing of value to the end-user eventuates.

STC also needs to focus more closely now on exactly how it intends to go about exploiting the patents or copyrights that may accrue to it from the R&D efforts it finances. Under its contracts with researchers, all such rights accrue to STC. In addition, we think this project

has demonstrated its feasibility sufficiently to be of potential interest to other international donors. This possibility should be explored by STC.

Finally, our interviews with industry revealed that in many cases they feel a greater need for short-term consultancies in such areas as plant operations and process than for the longer-range sorts of R&D provided under this project. Certainly such a need exists regardless of how one might rank the two types of assistance with respect to priorities. STC is contemplating moving into this area. If it is able to do that without a significant diversion of resources from its main focus, such an activity could serve as a source of revenue to STC in addition to enhancing its entre to the industrial sector.

THE EVALUATION REPORT

I. INTRODUCTION

A. Summary of Scope of Work

The overall scope of work for this evaluation states:

"The overall purpose of the evaluation is to assess the original project designs and their relevance to current Agency and Mission strategic objectives as well as to evaluate progress toward achievement of project purposes. The evaluation will make recommendations for adjusting or redirecting project activities so they contribute more toward the achievement of strategic objectives as well as recommendations for improving the project implementation. While it is too early to determine the impact of project funded activities, the evaluation will assess the potential future impact of project activities on project goals and strategic objectives." (Underline added).

B. Methodology

This evaluation was carried out over a period of four weeks by a three-person team consisting of two expatriates and one Egyptian engineer.

The methodology employed was essentially that of longitudinal studies of as many of STC's existing projects as could be carried out in the time given. That is, after reading the background materials provided by the Mission and STC, and after extensive interviews with the management and staff of STC, we set out a research schedule designed to (a) provide a representative sample (i.e. covering each of the three priority areas of industry, local and regional and high technology) of projects funded and (b) to allow each of the three team members to concentrate on those subject areas in which he had had most previous experience. The Team then (1) studied all of the documentation on each project, and (2) interviewed end-user, researcher and, where possible (and where it was neither of the above) the proposer of each project.

In most cases this included site visits to projects in implementation as well as laboratories where bench scale work was being done. The Team did these longitudinal studies on 15 (See Annex I) of the 30 projects² financed to date by STC. The Team also went through the documentation on three more projects that are temporarily suspended.

² The words "project," "sub-project," "grant" and "contract" are used more or less synonymously throughout this report to refer to specific research and development activities funded by STC under the STC project. The particular word used in any case corresponds, in general and to the extent such specification is warranted, to the specific aspect being treated. We are aware, however, that where no specific context exists we have used these terms more or less interchangeably. We beg the readers' indulgence.

II. BACKGROUND

The Science and Technology Cooperation (STC) project is one of four projects which, under an umbrella S&T program (Science and Technology for Development, (STD) Project No. 263-0140), attempts to build on 15 years or more of AID work in Egypt designed to strengthen Egyptian S&T capacity. The STD project is designed to put that enhanced capacity directly to work to solve problems deemed to have a priority impact on Egyptian development. Its approach is to move S&T out of the laboratory and apply it to the solution of "real-life" problems (while not, however, overlooking the need to continue the earlier capacity-building effort). It is a wise, sound follow-on to earlier efforts.

The STC project focuses on three specific areas of application: industry -- National Research Program (NRP) in the fields of industrial chemicals and building materials, local/regional government applications -- Local Research Program (LRP) in the fields of lake ecology/fisheries, local level sewage disposal and water/waste water treatment and -- advanced techniques -- Advanced Technology Programs (ATP) in the fields of computerization of industrial processes and biotechnology. "Tagged onto" the local/regional government rubric there has emerged a fourth category of projects, Small Industries, designed to stimulate investment in small capitalization projects and the emergence of a new group of small entrepreneurs/investors.

The leit motif of this project is proselitization: spreading the word to potential end-users in industry and government about the value of RD & E (research, development and engineering, i.e., the application of S & T to "real world" problems), as was set out in the Project Paper covering this project:

"There is still a wide gap between end-users (the potential consumers of technology), and the suppliers (scientists and research workers). There is limited understanding of the necessary linkages between research, technical development, and engineering as well as the role of socioeconomic and techno-economic studies ensuring the adoption of research results. . ."³

That having been said, it also needs to be noted that the major industrial manufacturing activity in Egypt is in the public sector. Many of these plants are old and out-dated. Their problems are modernization, restructuring, technological upgrading and competitiveness apart from other day-to-day problems. They need more technical and engineering assistance in these areas which is not easily available locally. This sector is also expected to be privatized as per GOE announcements. In view of this, it is all the more important that these enterprises be brought up to a level where they become attractive to private local and foreign investors.

The private modern industrial sector is a recent phenomenon. Enterprises in this sector are large in numbers but are mainly in the small and medium industry sector. Many of them are

³ P. 2, Project Paper, "Science and Technology Cooperation" (263-0140.1).

based on imported technology and know-how. They cover a wide band of the industrial spectrum. The problems faced by this sector are technological adaptation of plant and machines to local needs, production management problems, quality and productivity improvement, local raw material adaptation and so on. These are technical and industrial problems requiring quick response and solution through industrial and technical consultancy assistance.

At the extreme end of this spectrum are micro and small industry enterprises in the private sector which have somewhat the same range of needs as above. However, there is a need to expand this sector further as it creates more jobs with less capital outlay. Technology is not the constraint for this sector. The need is to identify and train new entrepreneurs/investors and provide them with technical and management assistance, finance and marketing services.

The STC project does not address these issues directly as its focus is mainly on applied R&D. Some components of the STC project do address the needs of the small scale sector but only in a limited manner. This evaluation, while not taking issue with the targets set out in the original project design (which we feel continue to be valid), does make some suggestions for adaptation of the project to meeting the needs suggested immediately above.

Finally, we are aware of USAID's desire to move as much of this program as possible into a greater consonance with the emerging priority to be placed on environmental concerns. The Team thinks this can be done in a number of important respects and have addressed that issue throughout this evaluation. The Team feels constrained to add a caveat here, however. **Attempting to subsume this project into other areas of USAID priority, such as environment or private enterprise (to which it also has close links), if that were to result in an attempt to significantly rewrite project objectives or otherwise cause a serious shift in categories of sub-projects to be funded,** would be an attempt to submit this project to a Procrustian bed treatment it probably could not survive.

III. THE SCIENCE AND TECHNOLOGY COOPERATION SECRETARIAT

The Science and Technology Cooperation Secretariat (STC) was established by the Government of Egypt to administer the Science and Technology Cooperation Project. It was established as a "Unit of Special Character" under Egyptian law, meaning that, although it is a government agency, it is exempt from a number of regulations such as that governing maximum pay rates to GOE employees. This provides for more agile management than might otherwise be the case.

STC is a part of the Academy for Scientific Research and Technology (ASRT) which, in turn, is a dependency of the Ministry of Scientific Research. It is housed in the Academy's building and its scientists are employees of the Academy or other institutions on leave from those bodies.

STC's governing body is the Steering Committee (see Section IV. below) which, in addition to setting overall policy and deciding upon priorities, must approve all projects over US \$250,000. (Although the Executive Director has the authority to approve projects for less than that amount he has never chosen to exercise it.) It also approves the panels from which project evaluators are chosen.

The Executive Director of STC is Dr. Ahmed Samih El Nokrashy, a highly respected scientist and teacher and a man with considerable previous experience in working with AID and with the Egyptian scientific research community. Under the Executive Director there are four "Managers": the Technical Liaison Office Manager (who functions day-to-day as Dr. Nokrashy's Deputy), the Research and Development and Engineering Manager (actually a position involving financial/business analysis), a Training and Staff Development Manager and a Financial Services and Administration Manager (the position had been vacant for some time at the time of this evaluation).

At a third echelon are two "Administrative Assistants," one for Communications and Reporting and one for Management Information Systems. (The Administrative Assistants actually occupy positions of considerably greater responsibility than that title would imply in U.S. Government parlance.)

There are two additional Technical Liaison Officers, one for 10th of Ramadan City and one in 6th of October City. Each of these TLOs spends about half his time in those locations and half in Cairo headquarters.

Support personnel bring total STC staffing to 22. It is a very lean organization. Its professional staff is well trained and highly motivated. Dr. Nokrashy runs a tight ship with very high morale.

Although there is no need here to discuss fully each of the professional functions carried out by the Secretariat, some do warrant more detailed treatment.

The TLOs are, in an important sense, the "heart" of the operation. They establish and maintain contact with potential industrial end-users. Working both with Chief Executive Officers (CEOs) and operations-level personnel of industrial plants, the TLOs look for opportunities to enhance efficiency and/or productivity through R&D solutions. In many cases this means uncovering and analyzing problems that the industries in question may not know they have. It also means that the TLOs must be aware of, or have access to, current information on who is doing what in R&D. They do appear to have that information in part, at least, through ENSTINET (see Section IX). It is our impression that they are doing a good job as the "extension agents" of the "R&D philosophy."

The RD & E Manager and her staff screen research proposals from a financial/business point of view, trying to assure that the funding proposed is reasonable, that equipment desired is appropriate to the task, that proposed disbursement schedules are commensurate with project time-tables, etc. This function appears to be very well carried out at present from the point of view of assuring sound, business-like scrutiny of sub-projects.

However, we found some instances in which some of the smaller researchers, unaccustomed to handling rigorously controlled research grants, appeared to be encountering problems precisely because of their inexperience in this (to them) new area. One common problem appeared to be failure to "front end load" their proposals so as to be able to handle mobilization and start-up costs; their tendency seemed to be to propose, or agree to, "flat" expenditure schedules, the same amount to be disbursed in each quarter. Another problem seemed to be that some of the (again smaller) researchers were not aware that STC will, with adequate justification, provide additional (i.e., unscheduled) advances against future disbursements where unforeseen contingencies have caused short-falls in scheduled quarterly funding. This group of researchers needs technical assistance in grant management.

U.S. procurement is an area which, despite apparently well-thought-out procedures, appears to be presenting some problems. U.S. procurement is carried out through a U.S. purchasing agent, the American Manufacturers' Export Group (AMEG). Once detailed specifications for desired research equipment are provided by the research team (that may be a time consuming process), they are sent to AMEG which sends out requests for proposals. The normal period allowed to receive proposals is 30 days. Proposals received are sent back to STC in two packages. One contains the technical specifications of the equipment offered. The other contains prices. Only the first is sent to the researcher who is asked to choose among the alternatives based on specifications. Only after he has made that choice is the pricing information given to him. At that point he may elect to change his choice to save money for other project purposes or, if his choice is over-budget, STC may require detailed justification for the higher-priced equipment as opposed to a lower-priced alternative. All of this is time consuming but seems sound in terms of effective value-for-money procurement. However, normal time for U.S. procurement is running at about four to five months.

At a very simple level, some researchers apparently had not anticipated the normal four to five month delay involved in procuring equipment from the United States. In addition, some procurement seems to have taken considerably longer than that. (The Team has excluded

from these comments cases of procurement delays due to the Gulf War.) The Team was also told of two cases ⁴ in which the local agent of AMEG delivered the ordered equipment, installed it improperly and refused to come back to complete the installation job despite having collected an installation fee. (It should be pointed out that where the U.S. vendor has a local agent, delivery and installation are done through that agent.)

The STC Secretariat's 20 Cairo-based personnel are crowded into six offices in space allotted by the Academy for Scientific Research and Technology. This is crowded even by normal GOE standards.

Sustainability

This issue emerges as the single most important topic explored by the Team in the course of this evaluation. Although it is touched on at a number of points in further sections of this paper, we will try to pull it all together here for purposes of coherence.

The basic question, of course, is: What happens to this project when AID funding stops?

At present the project is funding all staff costs of STC, all dollar project costs and most of the LE costs of sub-projects. The GOE is paying for the cost of housing STC and some LE project costs. Some end-users are covering some of the LE costs of sub-projects. Most of the GOE and end-user contributions are in kind.

STC has several possibilities for raising revenue from project or project-related activities, some of which it is starting to explore. Several more possibilities were raised with STC in the course of this evaluation. Only time will tell which of these various possibilities prove to be feasible and what proportion of project costs might be covered in these ways. Furthermore, some of these ideas for revenue raising give rise to subsidiary questions relating to scatteration , i.e., fragmentation of STC efforts in pursuit of objectives divergent from project goals.

Nevertheless, and despite the fact that this project has only fairly recently been launched, we think that priority attention must be focused on this question now.

Grant Initiation, Approval, Implementation and Monitoring Procedures

The Team spent some time trying to determine how grant proposals get initiated. One important source is a series of broad background studies of priority areas initiated by the Steering Committee. These background studies were carried out by Egyptian and foreign experts and a number of them contained specific suggestions for research activities which, after further refinement, were accepted. Some eighteen projects originated this way.

The two cases involved the procurement of a Plasti Corder (Barbender) by the National Research Center (Project No. 10) and procurement of a tensile testing machine for Cairo University Faculty of Engineering (Project No. 12).

Twenty-four projects were suggested by the TLOs. Eleven ideas came from members of the Steering Committee of which eight were of immediate interest to the members that proposed them. Finally, seventeen proposals "walked in through the door." (It should be noted that not all of these project ideas were finally funded; some are in execution, some are under negotiation now and some still are under consideration.)

Research proposals from researchers are not accepted. In every case they are told to find end-users who are willing to support the activity. (The degree of that "support" is discussed elsewhere.) Only after an end-user is identified will STC consider such proposals. That having been said, however, it seems quite clear that a number of research proposals that have been funded did indeed originate with the researchers in the first instance. **Neither that fact, nor the fact that a number of projects were put together by TLOs, as described above, causes us any concern. The purpose of this project is to bring end-users and RD & E providers together. In our opinion, these cases are examples of project successes more than anything else.**

In any event, after a potential research project is identified it is reviewed by a panel of experts chosen by STC from a list of subject matter experts approved by the Steering Committee. Panels are screened by STC for potential conflicts of interest; no one is chosen for this stage of project review who might have an interest in the proposal except that, following the basic project concept of end-user involvement, these review groups are chaired (at least in most cases) by the identified end-user. Based on this expert review, a background paper is prepared for the consideration of the Steering Committee. These are brief documents, seldom more than one or two pages, outlining for Steering Committee consideration the salient points of the proposal. (They should not be confused with the background studies referred to above, which are much lengthier, more detailed expert papers.) At this stage projects are submitted to the Steering Committee for their approval. (As noted elsewhere the Steering Committee must approve all projects over US \$250,000. In fact the Executive Director of STC has not utilized his authority to approve projects under that amount.)

A Request for Proposals (RFP) is advertised, once a project is approved for funding. Proposals received are reviewed by a Review Panel, also chaired by the end-user. Proposed Principal Investigators (PI's) are chosen from among the proposers and, based on the comments of the Review Panels, they are asked to submit "Best and Final Offers." These are the basis for negotiation and ultimate award of the research contract. Negotiations cover both the technical proposal and the budget and work plan. A contract is then drawn up incorporating the proposal as finalized in negotiations.

Once the contract is in execution, PIs are required to submit monthly expenditure reports and quarterly progress reports. The progress reports, in addition to their narrative portions, must estimate the percentage of completion of specific project sub-tasks, and a derived figure for overall quarterly goals, as against the work plans set out in their proposals and incorporated into their contracts.

The PI grantees are given an advance of funds based on their first quarter expenditure estimates.⁵ Reimbursement of expenditures of these advances are made against percentage completion reports. That is, if a PI reports completing only 80 per cent of project goals for any quarter, he is reimbursed only 80 percent of the projected expenditure for that goal in that quarter.

These quarterly reports are STC's and USAID's principal means for monitoring sub-project progress. It is the Team's impression that sub-project visits to either project sites or to PIs by either USAID or STC staff are comparatively rare.

⁵ This has caused some problems for less sophisticated grantees. We deal with this below.

IV. THE STEERING COMMITTEE

The Steering Committee (SC) is the supervisory authority and the policy making body of the STC. It meets quarterly.

The Committee is composed of representatives of the national organizations which have an interest in science and technology, i.e., the Ministry of Scientific Research, the Egyptian universities, the governmental sector (national and regional) and industry (public and private sectors).

The Committee is chaired by the Minister of Scientific Research. The President of the Academy of Scientific Research and Technology is the Committee Deputy Chairman. Also, both the Executive Director of STC and the Project Officer of USAID sit on the Committee as observers, with voice but without vote.

The first meeting of the Steering Committee decided to broaden membership to include the President of the Union of Egyptian Industries, the President of the National Research Center, the Executive Director of the "Technical, Technological Consultancies, Studies and Research Fund" of the Academy, and the Director of Developmental Research and Technological Planning Center of Cairo University.

The Committee decided to keep the directions and priorities set out in the original project agreement, noting that policy decisions and their implementation are the sole responsibility of the Committee.

Accordingly, on the national level the following priorities were agreed upon: a) building materials and their technologies, and b) the exploitation of available raw materials. In local regional projects the Steering Committee agreed to focus on a) lake ecosystems improvement, b) water and waste water treatment and c) small scale industries. The latter has emerged as a matter of separate concern. As far as the new technologies were concerned, two priority areas were selected: a) biotechnology and genetic engineering, and b) automated control and microelectronics.

As early as the first meeting, the SC formed six sub-committees of experts from the members of the SC or others to prepare studies and working papers dealing with each of the above-mentioned priority areas. In subsequent meetings five studies, which were prepared by the sub-committees (with the help of six members, experts and academics from outside the SC) were completed and discussed. The study on small scale industries was not completed until a later meeting.

Some of these studies focused on identifying the organizations potentially capable of carrying out research and development in these specific areas, and organizations which would appear to be potential end-users.

The SC also suggested taking action in two specific directions:

1. Developing production to be able to compete in the export markets. Stia and Vestia companies for cloth fabrication and ready-made clothing and Edfina company for food canning and preserves were suggested as the prime candidates for experimenting in this specific direction.
2. Developing production with the aim of widening the base of electronic components manufacturing and increasing the percentage of locally manufactured components utilized in electronic companies.

Similar approaches were adopted by the other sub-committees. Some of them took into consideration the previous studies undertaken by other Egyptian official organizations and various conference recommendations and official statements as well as the general guidelines of the national five year plan. For example, the study on drinking water treatment took into consideration the studies undertaken by the Environmental Research Council, the minutes of the Conference on Water Disposal, ministers' public speeches, the National Five Year Plan, and the plans of action of the regional research centers. The SC agreed on specific lines of projects within these prepared studies.

Another approach was adopted by the SC in looking into the letters received from governors and officials with specific requests asking for scientific and technological studies to be undertaken by the Academy or the Ministry of Scientific Research and asking for solutions to their regional problems. Enhancing local capabilities in R&D was stressed by the SC.

In most cases the SC agreed on the principle of acting through competitive proposals from interested researchers. An interesting exception was a case in which the SC invited a scientist, out of the normal competitive process, to supervise a project on low-cost building materials. This turned out to be a failure which has proved to be a hard but useful lesson. The SC later formed panels of experts for each project area (around ten). From these panels, three experts are chosen to evaluate particular project proposals.

The SC also approves requests for proposals against their background statements before they are advertised and approves the awards of contracts on the basis of the best and final offers.

Out of the ninety-two background statements submitted to the SC, seventy-eight projects had been approved to the date of this evaluation, eleven of which were proposed by the members of the Steering Committee. (Eight of these projects were in the direct domain of the SC members.)

The small scale industries segment is the least developed area in the work of the SC. It is dealt with in a separate part of the report (See Section VII. D.).

The Committee has stressed the importance of coordination among GOE granting agencies and researchers. It decided not to support any project which had been previously supported

or which is receiving support from other agencies. That is probably the reason the Committee invited many scientific leaders to become members, particularly those who are supervising other AID grant programs such as the General Secretary of the Supreme Council of Universities and the director of the National Agricultural Research Program (NARP).

The SC also has mandated the creation of liaison officers for each project. A new highly graded science or engineering graduate is to be appointed to liaise between the end-user and the principal investigator. The positions are funded initially by the Academy. However, in many cases liaison officers have gained permanent jobs with the employing end-users. This will help in creating new cadres which will be able to follow up on the applications of research results and coordinate R&D activities.

The SC publicizes its activities through press releases which highlight the main issues discussed in each meeting, particularly those touching upon developmental and industrial problems. This is a good step to create awareness among scientists as well as the general public of the activities taking place within the field of science and technology.

V. RD AND E SUPPLIERS

Background

The STC project focuses on three major program areas:

- The National Research Program (NRP) focuses on construction materials and industrial minerals and chemicals.
- The Local Research Program (LRP) focuses on improving lake ecosystems, water and waste water treatment and small scale industry.
- The Advanced Technology Program (ATP) focuses on computer-based technology and biotechnology.

Problem areas within the above program areas are identified on the basis of GOE assessments of development priorities in the country.

The STC Project and RD & E Institutions

STC seeks the participation of scientists from RD&E institutions in a variety of ways. They work as consultants and as members of evaluation and review panels. Their most important mode of participation is through bidding on projects proposed by STC through a competitive process. Only one public sector company has been awarded a contract -- EGYPTALEN, the R&D division of the public sector firm EGYPTALUM.

The major RD & E institutions participating in various STC projects in different capacities are listed in Annex G.

Out of these institutions, the National Research Center (NRC) is the premier R&D institution in the country having over 1,000 PhD research staff, over 2,000 research support staff and about 3,000 administrative staff. The NRC was established in 1956 and has 15 research divisions and 62 departments. It has a very active contract research program which generates considerable revenue for R&D work. The Electronic Research Institute (ERI) is a recent addition and has a staff of over 150. It has about 60 PhDs on staff.

The Central Metallurgical Research & Development Institute (CMRDI) came into existence as an independent institution in 1984. Before that, it was a division of NRC. It has a staff of over 120 professionals which include about 60 PhDs. It has full-fledged pilot plant facilities which were expanded considerably with STC project funding. CMRDI's five well-equipped departments include the latest additions to foundry and welding research and technical service mobile facilities. Currently, it has over 40 projects with industry besides eight STC awarded-projects. It receives LE 2 million annual budget support from GOE. It has received over LE 4 million from industry and international agencies for research and development

activities. For the eight projects awarded by STC, the Institute received LE 1.3 million and \$ 950,000 during 1990 and 1991.

STC Project Support to RD&E Projects

For all projects funded by STC the contract is between STC and the research institutes. End-users are not involved in this contractual relationship. End-user participation in a project is an expression of some degree of interest in the project which normally includes providing on site support for trials, tests, pilot plants operations, etc. Some end-users provide in-kind assistance such as raw materials, samples, etc., and the staff of the end-user firms may participate in the R&D work. End-user representatives are also involved in project review and evaluation. The degree of their participation varies from firm to firm. Some of the scientists interviewed noted that at times work gets held up because management is not in position to supply the requisite on-site support due to various reasons.

STC assistance to thirty-three projects approved during 1990 and 1991 (until March 1992) was LE 7,208,804 and US\$ 3,116,942 under USAID funding (source:STC). The end-user contribution in most of these cases is in-kind. Only in a few cases have the end-users stated that they have made cash contributions. The Team could not ascertain whether these were in fact received. There does not seem to be any contractual agreement between STC and the end-users on this matter of cash contributions.

STC contract awards for 36 projects (funding details were available for 33 projects) went to twelve RD&E centers. Out of these, two were awarded to two in-company R&D centers. Some of the research teams include scientists from other institutions. Out of these 36 projects, twelve were awarded to NRC, eight to CMRDI, four to the Faculty of Engineering, Cairo University, two to ERI and one each to another eight institutions.

Put another way, CMRDI received approximately 18.5 percent of LE and 30.5 percent of dollar funding; NRC received 27 percent of LE and 34 percent of dollar funding; Cairo University received 13 percent of LE and 15.5 percent of dollar funding; ERI received 7.5 percent of LE and 8 percent of dollar funding; and the industrial public sector Egyptalen received 4.5 percent of LE and 6.75 percent of dollar funding. In other words eighty-four percent of project dollar funding so far has gone to affiliates of the Academy.

The major portion of dollar funds are utilized for procurement of imported equipment and international travel by research staff; LE funds are used for salaries and local supplies. The tables and the above analyses indicate clearly that the R&D capability in Egypt being funded under this project is concentrated in few centers and STC funding, besides providing applied R&D support, is probably contributing to infra-structural needs by way of equipment, instruments and travel/training support to these institutions. Most of these institutions have serious funding problems for these kinds of needs. There is a squeeze on budgets and more so when it comes to imported equipment, instruments and machinery as well as international travel. CMRDI budget figures, as reported by its Chairman, show that STC funding accounts for at least 25 percent or more of its budget requirements for these items.

Some Comments by Principal Investigators (PIs) and Scientists

1. Some of the PIs and scientists suggested that project reporting and expense reimbursement systems are too elaborate and time consuming. The frequency of reporting needs review as also does the method of reimbursing expenses. The present system causes delay and, if modified, could result in savings in time and administrative expense.
2. There was a frequently expressed feeling that peer reviews and evaluation reports are at times perfunctory and superficial and in some cases done by experts in some fields who, however, have no expertise in the concerned fields.
3. In cases of projects which involve major technology and process development and large project outlays, some PIs explained that the R&D work they are undertaking will not, by itself, result in commercially applicable technology. To reach that stage further work will need to be undertaken by the end-user or STC, as the case may be, in engineering, design and scaling up or preparing industrial prototypes. R&D institutions do not have this expertise. This work is generally undertaken by project design and engineering firms. This expertise is not available easily in Egypt. A concern was expressed that probably neither STC nor end-users are fully aware of this and may have high expectations that they will get a completed engineering know-how package at the end of pilot plant work. In view of this, it was felt that, in these kinds of projects, it may be necessary to involve foreign project engineering experts relevant to the project to work with the project team and company management and technical staff.
4. While the end-user orientation of the project was generally accepted by the PIs, who made attempts to involve end-users in the work, management commitment to follow through on the projects was not always clear.

While the Team has made no specific recommendations on most of these matters AID should discuss them with STC.

Intellectual Property Rights, Know-how Contracts

Under the terms of the grant agreements between STC and the R&D institutions, the full ownership of any rights to intellectual property arising out of work undertaken pursuant to the agreement rests with STC. The first contract transferring the know-how for production of the urease enzyme was signed between STC, the end-user company, El Nasr Pharmaceutical, and the National Research Center was finalized recently. Under this contract, the company is to pay a lump sum of LE 50,000. Out of this, 40 percent is to be paid to NRC. The total financial outlay on this project for R&D work was LE 157,700 and \$ 127,000. The equivalent LE value will be around LE 550,000 paid to NRC for salaries, equipment, travel, etc. Two more enzymes will be developed and the know-how will be transferred to the company, probably under a new contract.

The Team feels that there is a need to work out the commercial and financial rationale of such arrangements.

VI. THE INDUSTRY END-USERS

STC End-user Portfolio

Up to March 1992, STC had awarded 36 projects with the affiliation of 30 end-users. Out of these, six projects were not being implemented for various reasons. Four of these projects are in the water and waste water area and two in the lake ecosystem area. The remaining 21 projects are designed to result in industrial applications in:

Industrial minerals and chemicals	13 projects
Construction materials	1 project
Automation	5 projects
Biotechnology	2 projects

Though five small scale industry projects were approved, only two seem to be under implementation. Four end-users whose projects are under implementation are from the private sector. Sometimes an end-user is listed as private sector even though up to 90 per cent of the holding in the company may belong to a Ministry and nationalized banks. This is a definitional problem. The majority of the industrial end-users are public sector companies.

STC Initiatives

STC experience has been that industrial end-users, whether public or private, do not see the need for R&D. It was reported that, in the past, STC invited proposals through a newspaper advertisement. Only eight responses were received out of which only two were serious. As a result, STC has had to use a variety of promotional approaches to stimulate end-user interest. After two years of work, industry is now showing interest in approaching STC with requests and enquiries. STC is also trying to implement the industrial incubator concept in the 6th of October industrial park by setting up a few small scale demonstration units and using them to interest and train young entrepreneurs.

End-user Involvement In R&D Projects

STC makes it a point to identify an end-user with every project. The end-users thus identified by STC or an R&D institution play a role in project evaluation and review and implementation and also contribute in-kind support to the project. In one project, the end-user agreed to contribute in cash. STC does not appear to be actively seeking end-user cost sharing contributions as a condition of project approval.

Some Comments By Industry End-users and Non-Users

When questioned about the commitment of their companies to commercialize R&D applications arising out of the project, some of the executives stated that, while they were interested in "their" project, they had not seriously considered the implications of

commercially implementing the R&D. This was particularly so in the case of projects with larger outlays involving process know-how development. Some executives also wondered about the level of R&D pilot work in relation to the size of the project and the need for project design and engineering requirements. One of the end-users interested in a process development project, and who had agreed to fund some project costs, was very eager to speed up the work so that he could go to the market place as quickly as possible. In spite of the interest on the part of many end-users, their direct involvement in the R&D work was minimal.

A discussion with some of the private companies in the new industrial parks indicated that their problems were more in the short term problem solving, technical areas. They felt that STC should try to offer some help in this area and that the industrial units could pay for such service.

When asked about industry sharing the cost of R&D work, some of the executives stated that they might be willing to do that if the services offered was relevant and of value. They responded favorably to the notion of a conditional grant which, however, would be paid back, with some premium if necessary, after the successful application of the R&D work undertaken⁶. Some of the larger end-users said that the technological needs of some of the enterprises were technology up-grading, modernization and restructuring, and the need was to get expert help in these areas which was not easily available in the country.

One model for such a "conditional grant" is spelled out in Annex J. Examples of such programs previously funded by AID will be found in India, among other countries.

VII. PROGRAMS

A. National Research Program (NRP)

The NRP focuses on well-defined major national problem areas. It was felt that R&D units in the major universities and research centers were better equipped and more capable of solving problems than were other R&D units in Egypt. This means they require less capacity building and, in working with them, more emphasis can be placed on technology transfer.

Three problem areas were originally identified for STC program funding. Of these the problem area related to soil improvement was dropped from STC consideration as it was to be handled by another AID-funded project, the National Agricultural Research Program (NARP). The two remaining areas for STC project funding are described below.

Construction Materials: This was selected in view of the increasing demand for construction materials in Egypt. The demand for construction bricks is expected to reach 10 billion in 1990 and 15 billion by the end of the century. There is a ban on using agricultural soil for brick making, an industry which provides employment to over 72,000 people. The problem is to find substitute materials other than cement.

STC was expected to finance a series of R&D projects aimed at finding suitable substitutes. These include:

- laboratory and pilot plant investigation of raw materials and suitable additives;
- solution of technical/engineering problems involved in attempted uses of local raw materials;
- artisanal brick manufacture processes, methods, design of equipment and a study on the economics of manufacturing.

Industrial Minerals and Chemicals: Egypt imports industrial minerals and chemicals for industrial processing at a cost of LE 160 million per year. Industry observers say that local materials could be used to manufacture many of these materials. There is a large industrial sector in Egypt which stands to benefit from STC-funded RD&E projects in this area. These include:

- techno-economic feasibility studies;
- quality improvement in ceramic and clay materials;
- kaolin and alum refining processes;

- production of inorganic and organic base materials;
- improving mining and mineral processing technology for various local ores, e.g., titanium dioxide from ilmenite ores;
- new alloys from slags; and
- pilot plant operations and beneficiation studies of minerals.

Other Technology Needs of Industry

Some of the larger end-users said that the technology needs of some of the enterprises were technology up-grading, modernization and restructuring and that their most pressing need was to get expert help in these areas which was not easily available in the Egypt. These issues are not addressed under the STC program. However, this is pertinent in view of the GOE's intention to privatize the public sector. Many of the enterprises to be privatized need this kind of input and restructuring if they are to be attractive to potential investors.

Relation to Other AID Programs

The STC program was aimed at increasing the interaction between R&D institutions and industry end-users. However, during the course of this evaluation other structural issues and needs of both the private and public sectors have been thrown into sharp relief. In the private sector the needs are for technical and industrial assistance and the creation of private service providers to address these needs. The small industry sector needs a package of services beyond technology which include finance, training and entrepreneurship development. The dominant public sector, which is open for privatization, needs assistance in modernization, technology up-grading and restructuring so as to become attractive to private investors.

USAID strategy hopes to address some of these issues through its goal of "improving productivity in strategic sectors of the economy" and by "the creation of new, or improved existing, institutional mechanisms to increase private sector participation in the economy." The institutional support component of the Mission strategy visualizes technical assistance to the public and private sectors as well as science skills development relevant to environment, water/waste water, industrial waste management, etc.

The STC program, directly and indirectly, addresses a number of these issues through its project portfolio. In some of the areas noted above, the STC program has direct relevance to these parts of the Mission strategy and in some other areas it can play a supporting role to other Mission programs. Overall, the Team believes that the AID investment in the STC program so far has yielded positive results and that additional benefits should be possible through closer intra-Mission coordination between the STC

program and actual and proposed Mission private enterprise programs. However, see the caveat elsewhere about attempting to turn this **Into** an environment project.

B. Regional/Local Research Programs

To date, five local/regional projects have been selected for development. Of these, two deal with the development of the fishery industry in Lake Manzala (both are closely connected with the problem of pollution of the lake), one deals with the problem of sewage disposal in a typical rural village, and one deals with the treatment and disposal of sewage sludge. The fifth, which was to have dealt with underground water as a complementary source for potable water, was cancelled when it was determined that the principal investigator initially chosen was supervising too many other research projects to be able to devote sufficient supervisory time to this one. These research projects all are in their early to middle stages. None has yet reached the point of on-the-ground trials. Accordingly, the Team's examination consisted of a review of all available documentation on each project and interviews with the principal investigators and their staffs on three of them. The Team also talked to the end-user on the two Lake Manzala projects. The Team did visit the site -- Nawage Village in El Gharbia Governate -- of the village sewage disposal project. There we talked not only with the principal investigator and his staff but also with the Village Chief (the appointed official in charge of village administration).

The Team certainly would not quarrel with the priority assigned to these projects, all of which, if successful, have attractive potential for replicability. The fisheries projects, for example (one deals with open water fishing, one with the potential for fish farming) should be replicable throughout the series of saline lakes across the delta and perhaps elsewhere in Egypt. Project findings on pollution from both industrial sources and from raw sewage effluents (an important aspect of these linked projects), and the possibility of pollution control, should add importantly to the growing body of knowledge on water pollution, and possible solutions to that problem, throughout Egypt. Likewise, the development of successful techniques to combat illegal fishing methods (principally methods that take undersized fish and thus are depleting fish stocks in Lake Manzala) also should be applicable not only in the other saline lakes of the delta but elsewhere in Egypt. The sewage treatment and disposal project in Nawage Village, aimed at reducing the installation and operation/maintenance costs of village systems, is one of some six or seven parallel experiments underway throughout Egypt. The development of successful, lower cost/higher efficiency methods of sewage disposal at the village level is a clear national priority. The project for the disposal of sewage sludge for the Alexandria district deals with the same problem at the level of larger population concentrations.

Note should be taken of several important respects in which these regional/local projects differ from the industrial projects carried out by STC.

Probably the most important is the role/identification of the "end-user." In STC's industrial projects, the "end-user" is visualized, at least, as a company capable of

incorporating the results of an RD&E project into a commercial process. His involvement at every step of the process is designed to provide assurance that the results of the R&D will be not only commercially feasible but actually put to work.

However, the "end-user" in most regional/local projects is a Governor (or several Governors). While they do have an interest in assuring that the outcome of the R&D will be successful, in terms of developing a process or technology that will "work," they are not end-users in the sense in which that term is normally used. That is, quite simply, they are not the ones who will ultimately use the technology developed. And to the extent that the technology to be developed is to be used by groups of people (e.g. the Lake Manzala fishermen) that use will be a function not only of the technological "success" of the R&D but its acceptability to the proposed users. The latter is by no means guaranteed however "successful" the former. (The point is too obvious, particularly to anyone with experience in economic development, to require further belaboring.)

There is a further point here, however, that does need elucidation. Although the local/regional development projects call for socio/economic studies, the contents and even potential uses of those studies do not seem to be very clear to the principal investigators and may not be all that clear to the STC staff. The scopes of work that the Team saw for several of these socio/economic studies varied considerably in their depth and completeness. In one case the socio/economic study was not scheduled to start until the start date for installation of the technology to be developed. Most did not investigate the potential role of women as either income earners (which could be critical in the fisheries projects) or joint (even if subservient) decision-makers, which could be important in the sewage disposal projects. In several of the projects the role of the social scientists was seen as getting people to accept the results of the project in the first instance, rather than ultimately arriving at that result by informing the investigator of what pitfalls to acceptance might exist, and hence providing some socio/economic guidelines to enlighten the R&D work.

Clarification of who the real "end-users" are also is important in another respect. As discussed elsewhere in this report, payment by end-users for as much as possible of R&D costs will be essential to the sustainability of STC after AID funding ends. While this may not be possible in all local/regional projects, it clearly is possible in a number of cases. In fact, the Nawage villagers are contributing LE 350,000 in cash and in kind to that project. The cash is coming from voluntary contributions. (The Team was told that villages have no independent revenue nor do they have the legal authority to raise any.) The fish farming project might have the potential for raising some local contributions if the techniques developed provide the potential for enhanced income for the fish farmers.

That project's principal purpose, however, is to provide an alternative to present illegal fish-trapping methods ("hosha") and it is not at all clear that the alternatives to be developed will be income-enhancing. The open waters fishery project is aimed squarely at developing fishing gear that will eliminate the illegal taking of under-sized

fish. This will almost certainly mean reduced incomes for the fishermen involved (which raises doubts about the viability of the project) unless some other income-enhancing elements are included, an aspect not covered under present project planning. This also points up, again, the need for more insightful socio/economic work as a component of these projects.

The main point here, however, is that at least some of the local/regional projects do have the potential for covering some of their R&D costs, and this potential is not being systematically explored.

One further aspect of the local/regional programs should be mentioned. As already noted, the designated end-users on these projects tend to be Governors. (No limitation exists on who the formal end-users of these projects could be but, given the socio/political realities in Egypt, that tendency probably will continue.) Although STC is trying to get the word out to some Governors, on an individual basis, we found no attempt to focus on the Governors as a target group in the same way that industrialists and entrepreneurs have been targeted in, e.g., the Alexandria seminar. The Team wonders whether it might be feasible to plan a series of regional workshops of, perhaps, a half day to one day each bringing together Governors in the various regions of the country to brief them on STC's programs and the potential that R&D might hold for solving local and regional problems.

Relation to Other USAID Programs and Priorities

The potential environmental impact of these projects is obvious and would seem to fit very well into the Mission's increasing strategic emphasis on environmental concerns. The Team feels it necessary to insert a caveat at this point, however. While stated priorities for the local and regional development program, by their nature, will tend to deal in environmentally related areas, care should be taken not to draw this line so tightly as to preclude worthwhile projects which may not relate intimately to that theme.

In addition, there would appear to be considerable potential for linking several of these projects to another emerging area of USAID priority -- namely Democratic Initiatives. Certainly the idea of local contributions to local projects -- and the consequent question of how local administrative units (e.g., villages) might raise revenues to meet such contributions -- is one that will emerge from any examination of local governance.

C. Advanced Technology Program (ATP)

The focus of this program is on two frontier technologies -- Biotechnology and Computer-based Technology. The objective is to build local capacity through R&D projects and train local scientists to adopt, adapt and discover new applications of these advanced technologies to agricultural and industrial problems.

Biotechnology

Two problem areas were initially identified: crops for semi arid lands and fermentation technology. The first was dropped as it was being handled by NARP. As regards the second, a joint review by the National Research Council and University Supreme Council identified twelve broad areas of R&D work that could be funded by STC. The industry capacity and R&D institutional capacity in this area is rather thin and in its infancy. While STC awarded two projects in this area, one has been partially completed and its know-how passed to the end user.

Computer-based Technology

The idea is to seek practical applications of computer electronic principles for industrial improvement, productivity and management/production controls. The initial focus is on computer process control and computerized production management. The potential end-users are expected to be from electric distribution authorities, public and private sector firms in food and textile industries. STC has such projects in the textile industry, food industry, process control in EGYPTALUM, and operation of an electric furnace.

D. Small Scale Industries

A sub-committee of the Steering Committee was delegated to prepare a study on small scale industries. The prepared study did not fully satisfy the Steering Committee, as the concept of small scale industries lacked a frame of reference. As put by a member of the Steering Committee, "the definition of small scale industries is still raising argument."

The Ministry of Scientific Research and Technology tried to utilize this project to serve some of the national pressing needs and to encourage young people and new graduates to start small scale businesses. The proposed benefits of this approach, as envisaged by the Ministry of Scientific Research and Technology, were to:

1. Increase national income;
2. Create new jobs and hence reduce unemployment;
3. Develop Egyptian technical capabilities;
4. Decrease the import level; and
5. Increase exports.

The support offered by the Ministry included:

1. Conducting a study of the real needs of the society to identify which projects would impact on such needs and the various equipment needed to fulfill the project.

2. Preparing techno-economic feasibility studies by top experts on such projects.
3. Contacting the various Ministries in the country to coordinate and facilitate the various needs of the project.
4. Supporting the administrative steps within the various government offices, concerning building and construction approvals, etc.
5. Providing technical help and supervising the project if needed.

An invitation for ideas for small productive projects (whose capital investment would be in the range of 5,000 to 200,000 L.E.) was advertised in the national press. About 900 responses were received and screened to about 50 by national experts from the various fields. The definition of small scale industries was broadened to include agriculture as well as industrial and even tourism activities.

The criteria for choosing these projects were; a) the level of advanced technology, b) the density of work-force needed, and c) the capital investment of the project (not to exceed LE 200,000).

The chosen 47 projects activities included animal and fish breeding, food production, chemical and cosmetic formulations, nail and screw manufacturing, electroplating, electrical heaters, low cost solar heaters, portable solar dryers and low cost brick manufacture.

It was decided to locate demonstrations of a number of these projects in one site in 6th of October City, where a training element could be included, so the project would be an educative and demonstrative as well as a productive one.

The detailed engineering drawings and the layout planning of the sub-project (for food industries) were prepared for: a) the site and the administrative building, b) a workshop for food industries, and c) the production laboratories (solar drying, cheese and butter, juices and concentrators, and mushroom laboratory).

The project is currently being delayed because of a delay in completing work on the site. It will go ahead when that work has been completed.

Experience elsewhere has been that technology demonstrations by themselves are not sufficient to stimulate the formation of successful small business, although they are an important part of packages designed to accomplish that result. Also needed, however, are financing, management/business training and technical assistance to the new entrepreneurs in the initial stages of setting up and starting to run their enterprises. Unless those elements are put in place in this project, we do not foresee it being effective in fomenting the creation of new small enterprises.

VIII. RESULTS TO DATE AND PROJECTED BENEFITS

The STC Project went into actual operation in January 1990. The Project supports R&D projects with end-user and RD&E institution participation. Most of these projects take between one year to three years to complete. Thereafter the end-user will decide to commercialize the R&D as per its plans and resource availability. As such, it is too early to assess the quantitative business and financial impact of this project. However, some of the other related direct and indirect impacts and benefits such as institutional, projected returns and services can be assessed qualitatively.

STC Project Objective

The STC Project was primarily designed to establish closer links between the end-users and R&D institutions to work on specific end-user R&D problems which are of national importance. STC has since its inception set a new standard and practice in the S&T community in Egypt to direct the efforts of R&D to serve the production and service sectors, responding only to their requests and working in close collaboration with them by defining deliverables and specifications.

Industrial and Other Sectors Served by STC Projects

Under the STC National Research Program mandate, STC was expected to work mainly in Advanced Technology, Computer Technology, Construction Materials and Industrial Minerals and Chemicals areas. The following industries were potential beneficiaries of 36 projects up to March 1992:

Chemical; Metallurgical; Plastics and Polymer Fertilizers
Textile and Dyeing chemicals; Paper; Rubber; Refractories and Glass Pesticides;
Construction materials; Cement; Paints and Printing inks; Soil-improvement materials;
Equipment fabrication; Small-scale industries; Computerized production management,
process control and CAD&E; Biotechnology & Genetic Engineering in industrial applications,
pharmaceutical and agricultural production.

Over 54 public and private sector end-users in the above industries are the potential beneficiaries of these projects. STC has awarded 36 contracts so far and the rest are under negotiation.

All of the major universities and R&D research centers in the country are working on these projects. They include the National Research Center, Central Metallurgical Research and Development Institute, Electronic Research Institute, the National Institute of Oceanography and Fisheries and Cairo University and 15 other university departments in engineering, agriculture and other disciplines.

Problem Areas Addressed By RD&E Contracts

The STC R&D contracts signed or under negotiation address the following areas:

Local raw materials as substitutes for imports

1. upgrading of local Kaolin; 2. manufacture of water treatment chemicals; 3. substitutes for imported asbestos and copolymer in vinyl tiles manufacture; 4. biocides for cooling towers; 5. chemicals for manufacture of reconstituted pressed leather.

Process development

1. hemihydrate-dihydrate process to phosphoric acid; 2. cement free sand bricks; 3. cement production; 4. high quality starch derivatives; 5. production of polypropylene and polyamide fibers for textile and other applications; 6. high quality lime production for bricks and other industries; 7. stearic acid and calcium stearate; 8. wool wax recovery; 9. productivity and quality improvement of edible gelatin; 10. galvanized wires by hot dipping techniques; 11. steel re-bars using thermo-mechanical techniques.

New products

1. enzymes for diagnostic kits and industrial applications; 2. alumina from local and imported ores, blends; 3. molding gypsum and medical plaster; 4. aluminum fluoride from fluosilicic acid waste; 5. titanium dioxide from local ores; 6. thermospray paints using local materials; 7. magnesium oxide from bittern solution-Al Max salines; 8. anticaking chemicals; 9. hollow fiber membranes for hemodialysis; 10. reactive non-benzidine direct dyes; 11. high quality inks.

Equipment Fabrication

1. grinding mills; 2. high quality cheese; 3. solar drying units; 4. activated bentonite from local ores; 5. high quality castings; 6. prototype electro-optic land-adjustment system; 7. shale-bricks production; 8. fractional hp single phase motors; 9. upgrading welding quality.

Clean Technology

1. in-plant modification to conserve water and residue; 2. handling of hazardous wastes; 3. reactive rinsing in electroplating process; 4. waste reduction in a refinery.

Waste & By-product Utilization

1. recovery of chromium from industrial waste water; 2. recovery of urea from effluent and reuse; 3. recovery and use of cellulose fibers; 4. utilization of steel-slag from construction industry; 5. agglomeration of iron oxide pellet-fines; 6. utilization of tire

wastes; 7. utilization of cement dust; 8. utilization of wood wastes; 9. recovery and regeneration of vegetable oil; 10 concentrates of black liquor for clay bricks.

Computer-based Technology

1. design and applications in the textile industry; 2. production management system in food industry; 3. device to control jacquard loom movements; 4. process control system calciner and DC caster in EGYPTALUM; 5. operation of an electric furnace.

Biotechnology

1. tissue culture macromolecular requirements; 2. enzyme production for clinical diagnosis kits.

Projected Economic Impact of STC Projects (Industry Sector)

As and when R&D work on some of the following projects is completed and when they are commercialized, their economic impact will be either in increasing the productivity or savings of foreign exchange involved in imports.

Project productivity increase/savings in imports in millions of LE⁷:

1. Manufacture of water treatment chemicals	25.0
2. Upgrading kaolin for industrial use	66.0
3. Local substitute for asbestos, copolymers	4.0
4. High quality starch derivatives	25.0
5. Stearic acid and calcium stearate prod.	2.5
6. Edible gelatin for pharmaceuticals	2.8
7. Computer in prod. management in food plant	3.0
8. Metallurgical alumina from local/imp. ores	140.0
9. Titanium dioxide from local ores	50.0
10. Magnesium oxide from bittern solution	50.0
11. Activated bentonite from local ores	4.9
12. Thermospray from local materials	2.0
13. Recovery of cellulose fibers from wastes	1.5
14. Recovery of waste oil from bleaching clay	3.9
15. Polypropylene/polyamide fibers for textiles	<u>8.0</u>
Total LE	413.6

STC estimates.

STC and Small-scale Industry

The STC direct assistance portfolio to this sector is limited. It has provided assistance to some companies, the details of which are given in the end-user section (Section VI). STC has, with the help of experts, prepared 48 project profile reports on small scale industries that could be undertaken by small entrepreneurs. This information has been given wide publicity through meetings, workshops and information dissemination through concerned agencies. STC is also setting up an incubator in 6th of October City with five small scale industry demonstration units where training and technical assistance will be provided to interested young entrepreneurs.

STC and the Private Sector

The STC portfolio of private sector end-users is gradually increasing. These clients have special needs, the discussion of which appears in the end-user section (Section IV). STC is trying to create the technical and industrial assistance capacity to serve this sector's needs through augmenting its Technical Liaison Office capacity. So far about 10 R&D contracts to the private sector have been awarded or are under consideration.

Local/Regional Projects

In addition to the small scale industries category mentioned above, which is part of the local/regional projects portfolio, STC projects in this area include sewage and waste water treatment for rural communities, recycling of treated waste water and sludge, aquaculture and open water fisheries in a saline lake (both of which also will investigate industrial and sewage pollution in Lake Manzala), and treatment and disposal of sewage sludge in a large city (Alexandria). It is impossible to estimate financial returns on these projects at least until the various technologies involved are sufficiently well developed to be compared with the costs of presently used technologies. Economic benefits in general are even more difficult to project with any specificity since they get into areas like improved health, conservation and maximization of presently depleted fish stocks, saving or recycling of water and similar areas.

Regional Coverage of STC Projects

STC, through its R&D contracts which are either awarded or under negotiation, has achieved the following regional coverage:

Alexandria Governate	25
Kalioubia Governorate	11
Cairo Governate	8
Behaira Governate	3
Quena Governate	4
Giza Governate	3
6th of October City	5
Sharkia Governate	2
10th of Ramadan City	4

South Sinai Governate	1
Ismailia Governate	2
Gharbia Governate	4
Damieta Governate	3
Dakahlia Governate	3
Aswan Governate	1
Fayoum Governate	1
North Sinai Governate	1
Port Said Governate	3
Red Sea Governate	2

Environmental Impact of STC Projects

Not the least of the benefits to be expected from a large number of the projects being carried out by STC will be their significant, positive environmental impact. The projects in which we anticipate such benefits are identified below.

Local manufacturing of some water treatment chemicals used in Egyptian industries; treatment & disposal of sludge produced from waste water treatment plant; pollution control of industrial effluents in Rosetta Branch water course; open water fisheries development in Lake Manzala; aquaculture in Lake Manzala; development of cost effective technology for a sullage conveyance system and septage treatment; pollution control of agricultural & domestic effluents in Damietta Branch water course; utilization of cement dust in the production of economical products; treatment of wastes of imported iron oxide ore to reuse it at Alexandria National Iron and Steel Company; recovery of chromium from the industrial waste water of El-Nasr Leather Tanning Company; production of selected reactive and benzidine-free direct dyes; recovery of valuable wastes from the industrial waste water of Edfina Canning Company and recycling the treated waste water; development of innovative technology for the utilization of tire wastes; improving the performance of air flotation systems at Alexandria Company for Oil and Soap and reuse of recovered oil in edible oil refining; safe handling of hazardous wastes of ISMADYE and efficient utilization of waste in the industrial process; recovery of valuable fibers lost in the white liquor and recycling of treated industrial water; production of black liquor concentrates and its utilization in the manufacturing of clay bricks; utilization of the wood wastes resulting from the production of matches in economical products; recovery of urea from the waste water and its reuse; utilization of slag produced at Egyptian copper company in the production of construction materials; making bricks from agricultural soil has been outlawed because soil is needed for agriculture. Thus efforts to find new ways to make bricks are environmentally related as are efforts to find substitutes for asbestos fibers; locally made substitute for imported asbestos and PVC/PVA, copolymers in vinyl tile formulations - Canaltex Flooring Co.; development of cement bonded sand bricks - 10th of Ramadan; solar vegetable drying; shale-brick production line - Misr-Iran Segwert, Ismailia Clay Brick Co.; benzine-fuel direct dyes - Ismadye, Alexandria; reuse of recovered oil in edible oil refining Alexandria Company for Oil & Soap; production of selected reactive and benzidine-free direct dyes - Ismadye.

STC Projects and Energy Issues

While STC projects do not directly address this issue, many of the industrial projects involving process development and technology development do consider energy conservation, efficiency and related issues as they form a significant component of production processes and manufacturing.

Seminars and Workshops

One of the important functions undertaken by STC is information dissemination and technology transfer through organizing seminars and workshops for industry, government officials, scientists and entrepreneurs. The Communications staff, Technical Liaison Office and Training Department are involved in this work. STC has so far organized seven such events covering the following areas:

small scale industrial projects; water and waste water treatment; STC serving the private sector; building units workshop; monitoring workshop on industrial minerals and chemicals; STC serving Alexandria industries; and monitoring seminar on automation in industry.

IX. ENSTINET

ENSTINET (The Egyptian National Scientific and Technical Information Network) is a scientific data retrieval service which makes available a broad and broadening range of Egyptian and international materials to Egyptian researchers. Originally established in 1983 under the USAID Applied S & T project it has continued to depend upon AID funding since that time. It presently is part of the S & T Cooperation Project.

ENSTINET receives its budget, both from AID and from the GOE, through the Secretariat for Science and Technology Cooperation. It is, in some respects, an administrative unit of STC although it does not share the latter's status as a "Unit of Special Character" under Egyptian regulations governing GOE ministries and agencies. (One problem that arises out of this will be detailed below.)

ENSTINET'S authorized strength is 35 although at the time of our visit it was down to 32 due to staff attrition. The Team were told that this was a typical condition. ENSTINET continually suffers from what it characterizes as a "brain drain"; its highly-trained computer operator/technicians keep moving into the private sector where they can command much higher wages than those ENSTINET can pay under GOE limits on salary payments to GOE employees. (This is one of the regulations from which "Units of Special Character" are exempt.) Other than that, ENSTINET's employees appear to be well-trained for their jobs. Motivation appears to be high.

The ENSTINET structure is an open-ended, centrally coordinated but geographically distributed network of sectoral information service organizations called "nodes." It presently has nodes in Industry, Science and Technology, Agriculture, Sociology and Criminology, Construction, Health and Engineering and is establishing two more in Planning and Education. These nodes are located in or near the GOE organizations responsible for those functions. ENSTINET also has nodes, or system access stations, at the Universities of Alexandria and the Suez Canal and is in the process of establishing others at the Universities of Zagazig, Mansoura, Tanta and Assuit. Administratively, these nodes function as component parts of the institutions in which they are located, serviced by ENSTINET.

ENSTINET's equipment is getting old. At the time of our visit their eight year old main computer was out. ITT, the provider, refused to service it because of its age. Other ENSTINET equipment provided under earlier funding also is moving into this technological "dotage." All of this implies a need for additional foreign exchange funding in the near future. In addition, ENSTINET is buying many of its foreign data bases on CDROMs, which provide faster and cheaper access to this information for network users but which also have to be purchased in foreign exchange. Finally, ENSTINET has plans to expand its network beyond the nodes to be financed under the present project agreement. This, again, will require foreign exchange for purchases of equipment.

Life-of-Project funding for ENSTINET under the STC program contemplates a USAID contribution of US \$1,800,000 and the LE equivalent of US \$ 900,000 and a GOE contribution of LE 360,000 in cash and LE 510,000 in kind. Seventy-five percent of ENSTINET's staff costs now are being covered out of the GOE budget and its own revenues, up from 50 per cent prior to 1992.

Although ENSTINET does charge for its services it charges less, in most cases, than the cost of providing the service. It provides free service to university students and to the STC. ENSTINET's Director argues that charging full cost (plus, presumably, a fee) for services would result in an actual loss of revenue (below that realized at present) since demand for services would drop off sharply.

ENSTINET also told us that in some cases raising their prices to a level that would cover their costs would put them above the prices of the competition. This seems to us to raise two questions: in the first place, why is ENSTINET assembling and installing data available on other (presumably commercial) information services? Secondly, if ENSTINET cannot make information available at prices that could meet competition, what does that say about the cost effectiveness of its operation?

The possibility of ENSTINET's survival as a self-financed institution, living off of its own income, does not appear likely within the foreseeable future. Even if the GOE were to fully subsidize its LE budget gap following the phase-out of USAID funding, the likely difficulties in getting access to foreign exchange would severely limit its operations.

X. CONCLUSIONS AND RECOMMENDATIONS

1. Sustainability

Even though it is the "early days" of this project, which is funded through 1995, steps to achieve financial self-sufficiency (i.e., "sustainability") must be considered now if they are to have any chance of being in place by the end date of the LOP. It must be kept in mind that the shortage of foreign exchange is probably the most critical constraint to R&D work in Egypt at the present time. The suggestions below -- and we lay them out as "suggestions" rather than "recommendations" -- would lead to some degree of financial self-sufficiency by the LOP final date.

The Team is not in a position to project to what extent the implementation of any or all of these suggestions would lead to the financial sustainability of this project by 1996. **Nor do we wish to indicate, in making these suggestions, that we would not recommend an additional increment of AID funding beyond that date.** Indeed, if this project carries out its present promise of success, which would have to be judged by another evaluation closer to the end-date of the project, it is our feeling that an additional, and final, funding increment would be justified.

With these thoughts in mind, **we recommend that AID and STC jointly consider the following suggestions for moving STC and its operations forward toward financial self-sufficiency.**

- A. STC should adopt a formal policy of requiring greater -- and progressively increasing -- contributions by end-users to, at least, the LE costs of R&D efforts. The ultimate goal should be 100 percent LE financing by end-users in the industrial sector. Efforts also should be increased to require (real) end-user contributions in local and regional projects although this may not be feasible in many cases (see discussion under Section VIII.B above).
- B. STC is considering setting itself up to provide short-term consultancy services to industry on a profit making basis in areas such as modernization, technology upgrading and industrial restructuring. (See the discussion in Section VII above with respect to the present unfilled need for such services and their relevance to industrial development, particularly in small- and middle-range private sector firms.) The Team thinks this is an idea very well worth exploring. Careful attention needs to be paid, however, to the staffing and managerial time implications of this idea.

Implementation of this idea **would** require additional staff and it is likely that, at least in its initial phase, it would take a good deal of the time of the already heavily-burdened Executive Director of STC. **If this operation were to degrade**

operations aimed at the original, and subsisting, purposes of this project it should not be undertaken.

- C. As an incentive to end-users to pick up more of the costs of R&D projects of potential interest to them, STC and AID should consider a scheme, which has worked elsewhere, of offering, in effect, a guarantee to end-users of a useable R&D product. This would be done by STCs making a loan to the end-user to cover his share of the R&D costs (all or some proportion of those costs). If the R&D results in a commercially useable application, i.e. one that the end-user decides to install, he is under obligation to repay the loan. (The loan may have a term of several years, which would make it more feasible in most cases.) If the R&D experiment does not pay off, the loan to the end-user is converted to a grant.
- D. If it should prove feasible to have end-users (or some combination of end-users plus the GOE) cover 100 percent of the local currency costs of the R&D, follow-on funding for this project, **should AID decide to provide it**), should be limited to funding of dollar costs. (See Section VI for a discussion of the significance of U.S. dollar funding to research institutions). Should such follow-on funding be provided -- **and it is our view that additional funding from some source will continue to be required at the end of the present LOP** -- the loan/grant scheme outlined under 3. above could be applied to dollar costs of R&D projects. This would have the effect of creating a "one-shot" dollar revolving fund in STC.
- E. Present contracts with research institutions provide that any patents or copyrights arising out of project-funded research will be the property of STC. Further thought needs to be given to arrangements for making proprietary processes available to industrial end-users under conditions which can assure a steady income stream to STC. (See the further discussion of this matter under Section VII.) This topic is another that indicates the need for direct contractual relations between STC and end-users.

2. The Industry Program

Conclusion: The National Research Program priority areas identified by STC limit it to two major industry related sectors. These areas are also the ones where the public sector has a dominant role. In addition, there are areas in which members of the Academy for Science and Technology Research have a "competitive advantage."

Recommendation: USAID should explore the present focus of project funding to see whether the addition of some other sectors would be warranted at this time. Some suggestions would be "clean technologies," packaging electronics, software development and food processing. There may be many other areas of interest. This way STC may be able to spread its net wider to include private sector industries as well.

Conclusion: The industrial units in the 10th of Ramadan and 6th of October cities which are mainly in the private sector have technical and industrial assistance needs which are somewhat of different nature than R&D projects as visualized under the STC current program strategy.

Recommendation: STC has a program mandate to assist in the promotion of small industries by providing proven technologies and technical assistance to entrepreneurs. Development of these small industries requires far more than that. It calls for an integrated package which includes these services along with the identification and development of potential entrepreneurs, financial inputs and marketing management services. Considerations should be given to expanding the scope of these incubator projects to include this component and offer these services on a fee-for-service basis in cooperation with other agencies. However, STC should not take the lead in this endeavor.

Conclusion: The STC project mainly utilizes the resources of public sector R&D institutions in the country even though one STC objective is to utilize the services of private engineering firms and consultancy groups. However, this has not happened partly due to the fact that there are few such firms in the country and those that do exist do not have adequate capability to undertake R&D contract work.

Recommendation: It is recommended that STC should make an attempt to involve the few private firms working in this area in project work in order to enhance their capacity and to stimulate their growth.

Conclusion: The research contracts are between STC and the R&D institutions. STC provides funds for both LE and dollar expenses.

Recommendation: STC should do more to encourage industry end-users to pay for such work. R&D institutions should also be encouraged to seek contributions from industry or other sources, at least for local costs, to be eligible for STC funding support. Such contributions may be sought selectively by evolving eligibility criteria.

Conclusion: R&D institutions involved in STC contracts have suggested a review of the various operating systems designed by STC for project review, evaluation, project reporting frequency and format, expense reimbursing, the composition and quality of experts undertaking reviews and evaluations. Some of these procedures cause delay. It was also reported that time taken from problem identification to contract award is often more than a year.

Recommendation: While STC has evolved a very scientific and elaborate system, based on the experience over the last two years STC should review these systems in consultation with the research institutions and attempt to speed up the process and reduce unnecessary bureaucratic work.

Conclusion: While both STC and the R&D institutions stress the need for end-user involvement in R&D work, in fact this involvement appears to be subsidiary to that of the researcher as the research contract is between STC and R&D institution. STC should explore the possibility of including the end-user as a party to the contract.

Recommendation: STC should include end-users as parties to its contracts with researchers so that the mutual rights and obligations of all parties are spelled out clearly. (Other aspects of this suggestion are spelled out below.)

Comment: STC has told us it intends to move on both of these suggestions. It intends to require increasing contributions from end-users and, in its next cycle of 22 projects, it intends to incorporate end-users as parties to research contracts.

Conclusion: Some of the R&D institutions and staff explained that there was need for foreign expert involvement in some major projects where project design, engineering and large scale manufacturing scaling up activities will be involved in a necessary second phase without which the R&D process will not be complete. Such expertise is not available in Egypt.

Recommendation: STC should examine this case by case and determine where and what external expertise may be needed and incorporate this in the project agreement. This may change the cost of some projects.

Conclusion: There appears to be reason to question the appropriateness of the U.S. consultation visits undertaken by R&D investigators under the program. Many visits in the U.S. are to institutions of questionable relevance to the specific research being undertaken.

Recommendation: AID and STC should identify a highly-reputed U.S. R&D type of institution, carefully tailored to the needs of the project, that arranges consultation visits such as those undertaken under this project. They should then determine the feasibility of having such an institution arrange consultation travel. Meanwhile, STC needs to review travel plans for these visits more critically.

3. **The Program - Local/Regional Projects**

Conclusion: The criticality of sound socio/economic research to the success of regional and local R&D efforts is not yet fully grasped either by STC or by the majority of the R&D researchers carrying out projects in this area. Nor does STC presently have the capability of evaluating proposed socio/economic research or monitoring its execution.

Recommendation: STC should put greater emphasis on this aspect of the work in regional and local projects. To do this, it should create a senior management level position for a social scientist (a sociologist or an anthropologist). That

official should be charged with (a) making sure that all proposals submitted for R&D work on local and regional projects contain an appropriate socio/economic research component, (b) approving (with such modifications as he/she may find necessary) all plans for such research and (c) monitoring on-going research in this area. Since the role of women is the most frequently overlooked aspect in the socio/economic research models we reviewed, consideration should be given to hiring a woman for this position if a suitable candidate can be found.

Conclusion: More attention needs to be paid to the potential for getting local contributions to the R&D costs of local and regional projects.

Recommendation: All proposals for R&D work on local and regional projects should include a discussion of whether it would be feasible to require a local contribution to such work and, if so, what steps the proposer would contemplate to get (real) end-user agreement to such contribution. These steps undoubtedly would have to involve the active collaboration of the nominal end-user (i.e. the Governor or other local official involved). This does not assume that such contributions would be feasible in all cases.

Conclusion: STC should increase its efforts to pull Governors (and other local officials) into the growing network of R&D end-users.

Recommendation: While there are a number of ways in which this might be done, STC might want to consider holding a series of regional workshops or seminars to brief Governors (and other local officials) on the potential of R&D for solving local and regional problems. The Team suggests regional workshops to cut down on required travel time for these very busy officials and also suggests the length of the seminars -- one half to one day -- be designed with this same thought in mind.

4. The High Tech Programs

Conclusion: While STC has made good progress in supporting projects under the National Research Program in construction materials and industrial chemicals and minerals, its progress in advanced technology programs is rather limited. This is so because industry in Egypt is still based on conventional technology and any switch to automation will take time. The same is true with respect to the biotechnology field. Its application to agriculture is no longer part of STC's mandate. STC has taken the initiative in this area. Through its projects and workshops, STC should strive to expose both industry and the R&D community to developments in these fields.

5. The Steering Committee

The Steering Committee composed, as it is, of some of the principal potential users and most of the important potential providers of R&D, is well designed, at present, to carry out the principal focus of this project: to create permanent linkages between

those two groups which ultimately will be self-sustaining. It has done a good job of setting policy directions for the project and of establishing and maintaining sound project evaluation and selection procedures.

Members of the Steering Committee also have been active in bringing in appropriate projects for STC funding. That is quite appropriate at this early stage of the project.

Looking to the future, however, we see a danger here. That is that the Steering Committee will come to be perceived as a "Club," an "Old Boys' Network" in which favors are exchanged, in the form of reciprocal support for each others' projects, to the exclusion of projects proposed by non-members. The problem we see is not so much one of potential conflicts of interests, although that could arise, but rather one of a general (if cynical) perception that will work to discourage the submission of projects by end-users or even by researchers.

Recommendation: The Team has no specific recommendation to make here other than that the problem should be raised and discussed with the Steering Committee itself. (At least one member of the Steering Committee with whom this problem was raised recognized it as a danger.) There are various possible solutions. One could visualize, for example, rotating the membership of the Steering Committee. Another possible solution would be to require that an increasing percentage of project proposals -- and finally more than some arbitrary number, such as 90 percent of them, come from outside the Steering Committee itself. The Team feels confident in leaving the final solution to the Steering Committee.

6. Procedures and Operations

Conclusion: Some of the smaller researchers who do not have experience in managing rigorously controlled grants need help in developing that skill. The Team sees this as very much a part of STC's job of trying to bring more and more of Egypt's R&D capacity into the "business" of providing more immediate, relevant answers to the country's development problems.

Recommendation: The functions of the RD & E Management Office should be expanded to include the provision of "technical assistance" in grant management to small researchers who lack that skill. This "technical assistance" should include advice on financial planning and projection of expenditures, areas of possible flexibility in the application of STC's procedures, how to "schedule around" procurement delays and similar matters. This advice should be provided not only in the initial STC review of proposed project budgets and disbursement plans but also, as needed, throughout the life of the project. It should be made clear to these researchers that they can turn to the RD & E Management Office at any time for this kind of advice and assistance.

Conclusion: Some problems are starting to crop up in procurement from the U.S. On a simple level these involve "normal" delays which, however, take some of the researchers by surprise. Other, more serious problems may be emerging involving the Cairo agent of the U.S. procurement company AMEG.

Recommendation: STC guidelines for preparing project proposals should note prominently, in the section dealing with the preparation of project time-tables, that procurement of equipment from the U.S. normally takes four to five months and that work-schedules/time tables should be made up with this factor in mind.

STC should look into the two complaints of unsatisfactory performance by AMEG's local agent and, if the circumstances warrant, should advise AMEG of the problem and request an early, satisfactory solution.

Conclusion: Although no one on the STC staff complained about it, their office space appeared to the Team to be inadequate for fully efficient operations.

Recommendation: AID should discuss with ASTR, or with the Ministry of Scientific Research, the need to provide more adequate housing for STC.

7. ENSTINET

Conclusion: ENSTINET is losing its highly-trained computer technicians to the private sector because it cannot offer competitive salaries. ENSTINET is subject to GOE regulations limiting salaries for GOE officials.

Recommendation: ENSTINET is part of STC and therefore might logically be thought to share the "Unit of Special Character" status of that organization which does exempt it from GOE salary limitations. If this is not the case, ENSTINET should seek such status independently or, at least, seek an exemption from salary limitations for its scarce computer operator-technicians. USAID should support ENSTINET in this endeavor.

Conclusion: ENSTINET's production and distribution costs (i.e., its total cost of providing a service to an end-user) appear to be higher than those of competing (commercial?) services.

Recommendation: ENSTINET should hire an outside consultant, familiar with the business of data base provision to researchers (or other end-users) to analyze its cost structures and production methods and to see where production costs might be lowered.

8. Relation to Other USAID Programs/Projects

Conclusion: This project has a number of aspects that are relevant to and should be of interest to managers of ongoing and contemplated Mission programs in business

and the private sector (including privatization), environment and local government/democratic initiatives. (Only the officer in charge of the latter program seems to have maintained an active knowledge of the STC project.)

An early strategy document contemplating the STC project suggested a USAID Coordinating Committee to periodically review project progress. The members of that Committee were to have been, inter alia, managers whose programs shared some common interests or concerns with the STC project.

Recommendation: Such a Committee should be activated now.

Note that we do not recommend that any attempt be made to turn the STC project into a private sector/privatization program, an environment program or a local government/democratic initiatives program. Any attempt at that kind of radical restructuring probably would kill the project which is working well now on a clear set of priority goals. Our recommendation, rather, is that USAID make a greater effort to exploit what we consider to be the considerable potential for synergistic effects that exist between this project and those others set out here.

Conclusion: During the course of this evaluation, the Team was informed that the Mission has decided to proceed with the University Linkages II (UL II) program. This is a broad, capacity-building program in S&T in which Egyptian universities are to be linked with U.S. institutions. The Team's reading of the background documents on this project indicate that, even though identification of end-users is to be required, decisions on projects to be undertaken will be driven more by researchers (including U.S. researchers) than by potential end-users.

We see a problem here. Even with the insistence that end-users be identified for each project, UL II has the potential of becoming a competitive rather than complementary funding source for Egyptian R&D institutions. This would be particularly true if project selection, approval and implementation procedures under UL II were not as rigorous as those under the STC project. The predictable result will be a lessening of interest in STC by the Egyptian R&D community and, inter alia, a potential loss of the rigor which STC has managed to instill in that community and a diminution of the valuable attempt to get the Egyptian R&D community to think in terms of applications rather than just laboratory research.

Recommendation: USAID needs to think through carefully how UL II and the STC projects relate. This relationship should give primacy to the STC project, which is well on its way to becoming an internalized Egyptian operation, but must do so in a way that does not subject STC (the institution) to extrinsic political pressure on the issue of project selection.

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ANNEX A PEOPLE INTERVIEWED

USAID

Henry Bassford, Mission Director
Dr. Richard Rhoda, Project Officer
Marc Madlen, Deputy Project Officer
Lawrence Brown, Office Director Finance and Investment
Timothy Hamman, Deputy Director, Office of Finance & Investment
Dennis E. Wendel, Deputy Director, Office of Local Administration and Development
Adel Y. Gohar, Project Development Specialist, Office of Education and Training

Government of Egypt

Ministries of Science and Technology and Industry

Professor Adel Ezz, Minister of Science and Technology
Dr. Abdel Fattah Mongi, Deputy Chairman,
Government Organization For Industrialization

Governorate of Ismailia

Dr. Ahmad Elgewely, Governor of Ismailia
(also member of the STC Steering Committee, "end-user" of the Lake Manzala fisheries projects).

STC

Prof. Dr. Ahmed Samih El Nockrashy, Executive Director
Dr. Fawzi A. El-Refaei, Technical Liaison Manager
Miss Abir Farouk Rizk, RD & E Manager
Ms. Samaa M. El Kassaby, Communications and P.R. Dept.
Miss Nagwa Abdel Khalek El Sayed, MIS Admin. Assistant.
Eng. Ezzat A. Hassan, Technical Liaison Engineer

End Users (Public and Private)

Chemist Amer Afifi, Chairman, Misr Chemicals & Coatings Co.
Chemist Mohamed Hassan, V.P./Managing Director, Misr Chemicals & Coatings Co.
Chemist Ahmed Fathi, Production Manager, Misr Chemicals & Coatings Co.
Eng. Soliman Reda, Chairman, The Aluminium Co. of Egypt
Mr. Abdel Aziz Ismaiel, President, General Director, Sand-Lime Bricks Factory
Eng. Fouad Attia, General Director, Sand-Lime Bricks Factory
Eng. Khalil Saleh, El-Nasr Co. for Sand-Lime Bricks Factory
Mr. Said El Fakharani, Chairman, Egyptian Fibers Co., Oriental Weavers Group

Eng. Reda Abd El-Baky, Production Manager, Oriental Weavers Group
Mr. Mahmoud El Bahtimy, Chairman, Abu Zaabal Fertilizer & Chemical Co.
Chem. Abdel Fattah Md. Agwa, General Manager, Abu Zaabal Fertilizer & Chemical Co.
Mr. Mahmoud Salama, Chairman, Egypt Oxygen, Private Sector Entrepreneurs
Eng. A. Shaarawi, Mg. Director, Engineering Products Co., Private Sector Entrepreneurs
Chem. Sabry Aglan, Consultant to the Minister of Industry, President of the Pipe
manufacture company, (member of the steering committee)
Eng. Adel El-Samahy, President of Edfina Company, Alexandria (member of the steering
committee)
Eng. Nabil Kazem, Director of Engineering Dept., Edfina Co.
Eng. Amal Shukry, Electrical Eng. Division, Edfina Co.
Mr. Hanafy Gad, Manager, Computer Dept., Stea Company
Eng. Mahwash Abdel Aziz, Director, Textile Wool Factory
Eng. Osama Abdel Wahab, President, El-Nasr Casting Company

The World Bank

Mr. Tribhuvan Narain, Operations Officer, Industry & Energy
Mr. Sherief Arif, Former USAID S&T Project Officer

Research Community

Prof. Aziza Ahmed Youssef, Director, Central Metallurgical Research and Development
Institute
Prof. Tawfik Refaat Boulos, Head of Mineral Beneficiation Dept. CMRDI
Prof. Adel Kamal Ismail, Head of Hydrometallurgy Dept. CMRDI
Prof. Abbas Abdel Kerim Yehia, Polymar and Pigment Dept., National Research Center
Prof. Ayman El-Dessouki, Electronic Research Institute
Dr. Mohsen El-Hagasy, Electronic Research Institute
Prof. Said A. Wahsh, Electronic Research Institute
Prof. Hassan Dorra, Professor of Automatic Control Faculty of Engineering, Cairo
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Prof. Saad El-Raghy, Professor of Metallurgy, Faculty of Engineering, Cairo University
Prof. Abdel Zaher Abou Zeid, Professor of Metallurgy, Faculty of Engineering, Cairo
University
Prof. Raafat El-Koussy, Professor of Material Selection and Testing, Faculty of
Engineering, Cairo University
Prof. Abdel Rahman Ragab, Department of Metallurgy, Faculty of Engineering, Cairo
University
Prof. Mohamed Abdel Hakim, Professor of Electrical Engineering, Faculty of Engineering,
Cairo University
Prof. Mohamed Gharieb El-Sherbiny, Professor of Mechanical Engineering, Faculty of
Engineering, Cairo University
Prof. Hassan F. Iman, Cairo University, P.I., Sand-Lime Bricks Factory

Prof. Dr. Adel Abdel Azim, CMRDI, P.I., Abu Zaabal Fertilizer & Chemical Co.
Dr. Magda I. Zaki, National Institute of Oceanography & Fisheries, Alexandria.
Dr. Mohammed Hashim, National Institute of Oceanography & Fisheries.
Prof. Dr. Hussein Samir Abd El-Rahman, President, National Research Center
Prof. Dr. Aly El Sherbini, Vice President, National Research Center
Prof. Dr. Ragaa R. Hamed, Molecular Biology Dept. National Research Center
Prof. Badran B.M.Badran, Polymers Department, National Research Center
Dr. Samy Mansour, Textile Engineering Dept. National Research Center
Prof. Esmat A.F. Abdallah, Director, Electronics Research Institute
Dr. Eng. Mohamed Saad El Sherif, Computer Eng. & Systems and other members of the
research team, Electronics Research Institute
Dr. Taha Abdallah, Cairo University, Sand-Lime Bricks Factory

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ANNEX C EVALUATION QUESTIONS AND ISSUES¹

1. The STC Secretariat

Q: Are administrative structures and procedures effective and efficient? Do they meet all AID and GOE requirements?

A: STC is a very well-run organization. Its principal administrative interfaces with AID are in the areas of procurement, financial reporting and project progress reporting. STC's records, mostly based on its own MIS system, are well kept and efficient and this information is passed to AID in a timely and useful manner. Although the STC is exempt, by law, from a number of GOE requirements, we have no indication that they are failing to meet those requirements of Egyptian law that do apply to them.

Q: Is the Secretariat appropriately housed, equipped, staffed and budgeted?

A: The Secretariat, with 20 people, of whom 13 are well-trained, highly motivated professionals, is adequate to the task at hand. They are squeezed into 6 offices, which is severely cramped in U.S. terms, crowded in what we understand are Egyptian government terms. An expansion of space to provide for no more than three professionals in any one office probably would contribute to greater efficiency. Space allocation also should take into account support personnel assigned to one given office, i.e. it probably would be better to have support personnel officed with their professional principal rather than having three professionals sharing an office with support personnel elsewhere.

The tight housing situation described is not a function of budgetary restrictions but rather GOE space allocation policies. STC's budget is adequate to the tasks at hand with one possible exception. USAID should consider purchasing cars for the two regional TLO's who are called upon not only to travel frequently between Cairo and their duty stations but also within Tenth of Ramadan City and Sixth of October City. This probably also would require a slight increase in monthly operating costs to cover fuel and maintenance.

In general SCT is adequately equipped to carry out its functions. Accounting should be computerized. This may require an additional work station.

¹. These "questions and issues" were given to the Team by the Mission with the request that those of most immediate relevance, as seen by the Team, be covered in the body of the evaluation report with the remainder to be incorporated into an annex. Since some of the questions answered here require some background to be to be comprehensible there is some inevitable redundancy between the matters covered here and other matters covered in the main body of the report.

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Q: Are administrative, financial, and commodity control systems adequate to meet GOE and USAID monitoring requirements?

A: See first answer above. Although this evaluation is not an audit, we were favorably impressed by the management of STC at all levels including those specified in this question.

Q: Is the contract award process (from Background Studies through Request for Proposals (RFPs), Peer Review Panels, and Best and Final Offers, to Contract Award) working effectively and efficiently? Productive sector end-users with real technology problems need rapid solutions; what can be done to accelerate the process?

A: The contract award process is working effectively and efficiently to assure compliance with project goals, standards of professionalism and continued life-of-sub-project compliance with sub-project purposes. However it is time consuming and we think, based now on two years of experience, it would be desirable to reexamine those procedures to see if the time required cannot be cut down without sacrificing sound project selection and negotiation. We have made some suggestions about this in the main body of the report.

The need for real-time solutions to end users' needs is a separate question discussed in the body of the report.

Q: Has the Secretariat developed effective linkages with end user communities and with research organizations? Is the STC promoted effectively?

A: The STC is attempting to establish linkages with the end-user community through a variety of techniques. Its Steering Committee is made up of potentially important end-users representing not only the Government at national and local levels but also industrialists, including three from the private sector. Also on the Steering Committee are representatives of some of the more prestigious research institutions in the country. Both through ENSTINET and through evaluative site visits to research centers around the country the Technical Liaison Officers seem quite fully informed on Egyptian R&D capabilities. STC's position in the Ministry of Science and Technology and the Academy of Science and Technology Research (whose Chairman is the Deputy Chairman of the Steering Committee) also assures continued close contact with the research community.

The three TLO's - one in Cairo, one in Tenth of Ramadan City and one in Sixth of October City - spend the bulk of their time talking to potential end-users at both the top levels of those organizations and at the working levels. They attempt to identify problems amenable to an RD&E approach and then convince the firms involved to try such approaches. They have been successful in putting several projects together in this way.

That having been said, it also should be noted that STC contacts still tend to be heavily in the Public Sector; they have fewer contacts with Private Sector firms, particularly smaller firms. Its contact with the small scale sector is still rather limited. (The work of the

TLO's in 10th of Ramadan City and 6th of October City should change this over time.) This is partly due to the program definition and approach. STC is primarily focussing on the applied R&D type of projects as against the needs of private sector industry for quick, short term technical and industrial consultancies and assistance. Some of these issues are discussed in the main body of the report.

In addition to the work of the TLO's in raising consciousness about R&D among potential end-users STC uses a series of devices to "spread the word". In addition to a periodic newsletter to about 300 "target" businesses, the STC, through its Communications Manager, seeks maximum media pick-up of its activities. It also has fielded two seminars for potential end-users and researchers, one in Cairo and one in Alexandria. The latter resulted in a number of project proposals, 22 of which were approved for funding.

STC contact with the research community is close. However, despite a sprinkling of contracts around a number of research institutions in the country only a few major research centers and universities are heavily involved in R&D program implementation; they are not the only ones with qualified research staff and facilities. (See Section IV of the main report.)

It is too early to say whether these serious attempts to carry out the main purpose of this project will be successful in the long run in the sense of creating permanent links that would persist should STC disappear. This question is discussed at greater length in the main body of this report.

Q: How has the IDEA contract contributed to the Secretariat? Is additional technical assistance required?

A: The IDEA contract seems to have done an excellent job of guiding the STC setting-up exercise, helping them to establish their administrative, financial and operational procedures and training their staff through, *inter alia*, study visits to the United States. The STC staff are very pleased with the technical assistance received and still maintain close informal ties with IDEAS.

We did not see any areas in which further technical assistance is needed at this time.

Q: To what extent is the achievement of STC's project objectives being facilitated by the existing project organizational and administrative procedures, including participation of other organizations?

A: This question has been answered elsewhere in this annex and in the main body of the report.

Q: What steps should be taken to improve the overall functioning of the Secretariat?

A: Our principal recommendations on this point are covered in the main body of the report.

The present functioning of the STC Secretariat with the current program mandate is quite adequate and appropriate. However, if program focus were to emphasize industrial and technical assistance to private sector small and medium enterprises for quick response problem solving issues, STC would have to strengthen its Technical Liaison function at headquarters and field levels at 6th of October and 10th of Ramadan Industrial Parks. The present Secretariat consists of well-trained young professionals who are by and large generalists. The only technical staff are three members of the Technical Liaison Office. STC could also maintain a roster and resource bank of technical and industrial consultancy resources in the country in different fields which can be tapped for providing such services to the enterprises. It will be somewhat similar to ENSTINET which provides technical and scientific information needs. The new service, which could be called TECHNUNET, could provide the above services and information to enterprises through its resource bank. These services could include assistance in energy conservation, productivity and quality improvement and environmental/pollution control. STC should consider cooperating with the International Executive Service Corps (IESC) who provide volunteer high level technical experts to work with industry on a short term basis. This US based organization has an office in Egypt.

Q: Are the 48 feasibility studies for labor intensive small scale enterprises contributing to project objectives?

A: These studies are basically feasibility project reports based on available information put together by a series of experts. While these project reports provide a broad idea to a potential entrepreneur/investor, by themselves they are not adequate to produce results. STC has taken the initial steps of bringing the information together and making it available to various agencies involved in promoting small industries as well as a few potential youths and youth groups. STC is also setting up five prototype units in 6th of October City where training may be provided to young entrepreneurs/investors and has offered technical assistance to them. In this way, STC has partially fulfilled the objective it set for itself.

However, experience elsewhere with similar attempts is that feasibility reports by themselves rarely result in anything tangible. Small industry promotion involves a combined package of potential entrepreneur/investors, finance, technical assistance, marketing and management expertise and information on backward and forward linkages. During a brief discussion with Dr. Mongi, Vice Chairman, GOFi, he mentioned that there is a general lack of entrepreneurial and risk taking spirit in the country. People tend to prefer business/trade activity rather than going into manufacturing ventures. GOFI is proposing an entrepreneurship training program.

The objective can be fully achieved if there is an integrated program in which STC, GOFI and the financial institutions participate to promote small industry and entrepreneurship development program.

This topic is dealt with more fully in the main report.

Q: What should be done to ensure continued strengthening of linkages between industry and scientists after AID funding for the Secretariat ends in 1996?

A: The main body of the report spells out the Team's thoughts on the need for the continuation of the STC in some form after this project ends and various ideas as to how, financially, that might come about.

The STC Secretariat is playing an intermediary role in establishing linkages between industry and scientists located in various research centers and universities by providing grant funds to buy equipment and pay for travel and salaries. It has been reported that research centers and universities do find it difficult to procure scientific equipment and materials so badly needed for applied research and development work. Funds for international travel are also needed as are incentives to spend extra time on R&D work.

In the absence of AID funding or self-sufficiency based on some combination of income and other external donor support, industry or government would have to pick up this tab. It has been reported that research centers such as the National Research Center, the Central Metallurgical Research & Development Institute, Cairo University Faculty of Engineering and others were undertaking applied R&D work and were getting paid by industry through royalty arrangements even before STC came into existence. The main difficulty, it appears, was non-availability of funds up front to procure imported equipment, foreign travel wherever needed and salary and other related expenses. STC claims that industry in Egypt in general is a non-believer in R&D and their attempt is to build a community of believers so that industry will develop confidence in local R&D capacity. In some ways, STC is achieving this. The discussions with few industry executives and CEOs indicate that they have been trying to use scientific capability in the country in the past and that the STC intervention was timely as it provided funding support to undertake R&D work. Some of them even indicated that they may consider paying for the R&D cost.

The majority of end-users in the STC funded projects are the public sector industrial units. Most of them do not have in-house R&D capacity or qualified scientific staff to address R&D problems or interface with external R&D inputs. Most of these plants are old and outdated. The major management problems are restructuring, renovation and modernization of plant and machinery as well as establishing modern management systems to become competitive. It appears that the priorities and perceptions are different. As and when possible, managements are importing new plant and machinery which are capital intensive investments. In this situation, support for local R&D development may not get high priority from the managements of the businesses.

2. Research Contracts Program

Q: Are the accounting, reporting, and the Research Contract requirements clearly understood by the Principal Investigators?

A: There have been some problems in this respect. Mostly, where problems have arisen STC staff have worked with the PI's to clarify the requirements. However, some

problems do remain with respect to small researchers who are not used to managing complex external grants. Our comments and suggestions for handling these cases are set out in the body of the report.

Q: Are Principal Investigators receiving required (U.S. and Egyptian) commodities and other inputs in a timely fashion? What can be done to improve the procurement process?

A: Setting aside the disruption of procurement during the Gulf War, there have been some problems in U.S. procurement. We have set these out, along with suggestions for overcoming them, in the main body of the report.

Q: What are the strengths and weaknesses of the STC as viewed by private sector companies? public sector companies? local governmental units? and potential principle investigators?

A: The private and public sector manufacturing companies see the main strength of STC as providing funding support for R&D work without strings attached. One of the public sector companies felt that the management systems developed by STC were excellent and tried to replicate them in his company.

One of the private sector companies felt that development work needs to be speeded up so that they could go to the market-place without much delay.

Some of the private sector investors and the Vice Chairman of GOFI felt that the private sector needs are technical and industrial consultancy and assistance as against R&D. This involves quick response and problem solving skills.

The only local government representative we talked to was a member of the Steering Committee. He agreed with our assessment that there could be a risk, in the future, of the Steering Committee coming to be seen as a "Club" with a consequent "chilling effect" on submission of proposals from "outsiders."

Q: Are research contracts sufficiently focused on real development problems? Should steps be taken to better focus the research contracts?

A: Research undertaken to date is focussing on real development problems in the priority areas set out under the project agreement. The projects, if successful in developing the technologies they seek, should result in commercial applications. As set out in the main body of the report, we think the time may be ripe to broaden the program by adding further areas for research.

However there is a problem here, discussed at length in the body of the report, about full recovery of research costs from any single enterprise. That is, while savings or increased efficiencies resulting from a research project probably will be justified in terms of an industry, they might not be in terms of a single enterprise.

Q: What is the likelihood that the research contracts will solve the end user's specific development problem? What can be done to increase the likelihood?

A: This question is touched on immediately above. The inclusion of the end-user, from the beginning, in the process of problem definition through research design and project implementation through final acceptance by the end-user should assure, as far as such assurance is possible, that research projects do indeed result in commercially feasible applications.

If there is a problem here we would tend to see it in the opposite direction of that implied in the question. At the moment STC is focussing on "sure things" - in so far as they may be said to exist in the high-risk business of R&D. At this early stage of the process, where the principal focus of the project is trying to prove the value of R&D to Egyptian industries and other end-users, that is the correct approach. At a later stage, however, STC should consider moving out into areas of higher risk with the potential of greater returns.

Q: Are research contracts building sustainable linkages between scientists and end users? What can be done to strengthen the linkages? What can be done to generate greater interest of scientists in STC?

A: The first two questions have been covered above and in the main body of the report. In general the scientific community seems quite well aware of STC and its programs. Their interest in participating results from a combination of factors among which the main ones probably are (1) research funding, (2) possibility of procuring otherwise unavailable research equipment and (3) project "perks" such as consultation visits to the United States.

3. The Effectiveness and Sustainability of ENSTINET

Q: Are ENSTINET's organizational and administrative procedures effective and efficient?

A: ENSTINET is a mature organization which has been operating successfully for several years. Although subject to GOE regulations governing public sector organizations it appears to operate along U.S. business lines with respect to its organizational and administrative procedures.

One problem identified here is the imposition of GOE salary limitations which, predictably, is causing high staff turn-over in the critical category of highly-trained computer technicians. Consideration should be given to helping ENSTINET acquire the Special Status now enjoyed by STC which would take them out from under GOE salary limitations and allow them to pay salaries competitive with market rates for their technical personnel.

Q: Does ENSTINET have appropriate staff, budget, and equipment? Are revenues and expenditures balanced? Is the staff suitably qualified? Are the hardware and software systems appropriate?

A: ENSTINET's staff is appropriate for the moment although it will have to be expanded as additional nodes come on line. The same general comment can be made about its budget. Revenues and expenditures are not balanced; ENSTINET is, of course, a heavily subsidized operation and likely will remain so for some time. This question is set out more fully in the main body of this report.

Hardware and software systems appear to be appropriate; they are the ones used by many similar organizations elsewhere in the world. The hardware is aging however and will need to be replaced over time. For example ATT, the supplier, will no longer service ENSTINET's eight-year-old main computer. That computer was down at the time of our visit although ENSTINET personnel managed to jury-rig a system which enabled it to display its data search and retrieval capabilities.

ENSTINET's personnel are well trained and highly motivated.

Q: Will ENSTINET become a sustainable agency when USAID's assistance phases out after FY93? What steps should be taken now to improve its sustainability?

A: This question is dealt with in the main body of the report.

Q: Are administrative and financial control systems adequate to meet GOE and USAID monitoring requirements?

A: ENSTINET's quarterly reports, plus monthly status reports submitted as part of the AID/STC monitoring system, should be adequate to assure USAID monitoring requirements although we suggest this be supplemented by periodic site visits to be sure that problems are not allowed to "fester" before being picked up in the system. (We do not have any evidence that this is happening at present.)

Q: To what degree is ENSTINET meeting the technical and scientific information needs of Egypt?

A: We can't answer this question as asked, of course, since we cannot determine what those needs are. What we can say is that ENSTINET is well enough designed to be able to be expanded to meet whatever needs the GOE wants it to meet.

At some point, thought might be given to expanding the scope of the network to start to pick up social science research - a real gap in Egypt today which, as noted elsewhere in our report, impacts on the present work being done in the S&T field.

Q: What steps should be taken to improve the long term functioning of ENSTINET?

A: This is answered elsewhere in this annex and in the main body of the report.

4. USAID

Q: Is USAID effectively fulfilling its STC monitoring and accountability responsibilities? Has USAID effectively communicated its requirements to the Secretariat? Does HRDC/S&T have sufficient staff levels and skills to fulfill its project monitoring responsibilities?

A: USAID is fulfilling its STC monitoring and accountability responsibilities effectively. Its communications with the Secretariat appear quite open and good. Its staff levels and skills appear to be adequate to fulfill its monitoring responsibilities.

Q: What changes should USAID make to better insure achievement of STC's purposes and goals or to improve implementation of STC?

A: Some mid-course corrections to better assure achievement of STC's purposes and goals are recommended in the main body of the report. The main possibility of improvement that we can see lies not so much within the STC project itself, but rather in improved communications about the project within USAID. We have included a specific recommendation on this point.

Q: When and by what amount should the obligation level of \$9.44M be increased? If additional funds are not forth-coming, what will happen to the STC project?

A: We are unable to predict the timing at which additional funds will be needed for this project nor the amount of an additional obligation that might be appropriate in the event. We do note that STC sub-project approvals are increasing at an accelerating rate which would indicate that disbursement rates under this project will increase commensurately.

We have not looked closely at what percentage of the \$9.44M initial obligation is "committed" by its presently operating 34 projects plus the 22 new projects recently approved. However, a decision not to put any more money into the project would - unless another external funding source were found willing to invest both LE and hard currency - have two predictable effects:

1. It would force STC to limit the number of new project proposals it could entertain. To that extent it would slow down and seriously degrade the accomplishment of STC's priority objective which is to forge permanent links between Egypt's R&D community and a widening group of potential R&D end users.

2. STC's bright, well-trained staff would have to start thinking about their own futures, presumably elsewhere.

5. Overall

The answers to the following questions will be found above and in the main body of the report.

o **Is the project on a track leading to achievement of its goal and purpose? What changes are needed?**

o **How will the positive aspects of the project be sustained when AID's assistance ends in 1996? What changes are needed now to enhance sustainability?**

o **How is the project contributing to the Administrator's initiatives, USAID's strategic objectives and GOE S&T priorities? What can be done to enhance the contribution?**

o **What policy or program changes could the GOE or AID make to facilitate accomplishment of project goal and purpose?**

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ANNEX D
Science and Technology Cooperation Project
Awarded Subprojects Report

9 March 1992

	L.E Budget	US\$ Budget	EndUser Contr.	GOE Contr.
Advanced Technology				
Biotechnology				
TBIOT-006-001-005 Tissue Culutre Macromoleculare Requirements	150,800	\$127,800	0	326,700
TBIOT-010-001-006 Enzyme production for clinical diagnosis and Industrial Application.	157,700	\$127,000	0	722,750
TBIOT-016-001-035 Introduction of Bacilus thuringensis endotoxin gene into cotton plants			0	0
Computer Technology				
TCOMP-002-001-002 Integrated Computerized Control in Textile Industries.	308,900	\$95,000	126,000	282,000
TCOMP-003-004-004 Design and Application of Computer-Based Technology for the Development of Food Industry	325,000	\$160,000	275,000	150,000
TCOMP-001-001-008 Develop.of Jacquard Looms with a Device to Translate Designs Stored On Magnetic Discs To Mech.Action	237,000	\$155,000	280,000	458,000
TCOMP-004-003-018 Design, Develop, and Implem. of Computer Based process Cont.Syst.for EGYPTALUM Calciner&D.C Casters	325,000	\$210,000	325,000	200,000
TCOMP-005-001-023 Introduction of Computer Based Techn. to the New Electric Furance at Al AHLIA Co.	194,400	\$120,000	25,000	110,000
Total for Program :	1,698,800	\$740,000	1,031,000	2,249,450

15.

National Research Program

	L.E Budget	US\$ Budget	EndUser Contr.	GOE Contr.
Construction Materials				
NCMAT-002-002-022 Development of Cement-Bonded Sand Bricks	272,145	\$51,000	0	0
			Production Lines to Produce	
Cement-Free				
NCMAT-003-002-033 Sand Brick Development of Cement Production Technology			0	0
Industrial Minerals and Chems				
NMACH-004-001-001 Modification of Prod. Tech.of Phosph. Acid in Abuzabal Fertilizer & Chemical Co. to Hemi-dihydrate	164,784	\$148,557	35,000	120,000
NMACH-003-001-003 Local Manufacture of Water Treatment Chemicals Used in the Egyptian Industry.	172,180	\$63,840	40,000	135,000
NMACH-002-001-007 Upgrading Egyptian Kaolin	171,200	\$110,000	92,800	369,000
NMACH-005-001-010 Locally Made Substitutes for Imported Asbestos and PVC/PVAc Copolymers in Vinyl Tiles Formulations	54,000	\$85,000	99,000	115,902
NMACH-006-001-011 Production of Metallurgical Alumina from Local Ores, Imported Ores and Blends from Both	157,000	\$95,000	40,000	130,000
NMACH-008-003-012 Local Manufacturing of Grinding Mills	156,300	\$152,000	400,000	120,000
NMACH-009-001-013 Production of Moulding and Medical Plaster	177,000	\$96,000	103,000	261,000
NMACH-007-001-014 Production of Aluminium Fluoride From Fluosilicic Acid Waste of Phosphate Fertilizers Industry	116,500	\$133,000	35,000	97,000
NMACH-011-001-017 Production of Activated Bentonite from Local Ores.	153,000	\$150,000	15,000	130,000

	L.E Budget	US\$ Budget	EndUser Contr.	GOE Contr.
NMACH-010-004-019 Production of Titanium Dioxide for Paints and Welding Rods Industries from Local Egyptian Ores.	224,850	\$111,495	5,000	10,000
NMACH-012-001-024 Production of High Quality Castings For Different Industrial Sectors.	172,000	\$140,000	100,000	238,000
NMACH-013-001-030 Production of Magnesium Oxide from the Bittern Solution of Al Max Salines	312,000	\$125,000	145,000	50,000
NMACH-017-003-031 Local Production of Anticking Chem. used in Treatm. of Ammonium Nitrate&other Applications.	219,206	\$145,700	10,000	150,000
NMACH-016-001-032 Development of the Processing Methods for the Production of High Quality Starch Derivatives			250,000	250,000

Total for Program : 2,522,165 \$1,555,592 1,369,800 2,175,902

Regional Research Program

Improving Lake Ecosystems

RLAKE-002-001-027 Aquaculture In Lake Manzalah	360,035	\$38,600	13,000	146,600
RLAKE-001-001-028 Open Water Fisheries Development in Lake Manzalah	274,000	\$40,000	0	120,000
RLAKE-003-001-036 Development of a defence mechanism against blooms of jelly fish in coastal recreational areas.	258,621	\$4,200	0	0

Small-scale Industries

RSMAL-001-001-009 Appropriate Technology for Low-Cost self-Building Housing System	245,150	\$54,500	0	100,000
RSMAL-003-001-015 Development of Appropriate Unit for High Quality Cheese Making	70,300	\$0	0	70,000

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	L.E Budget	US\$ Budget	EndUser Contr.	GOE Contr.
RSMAL-002-001-016 Development of Appropriate Solar Unit for Vegetables and Fruits Drying	144,900	\$0	0	40,000
RSMAL-004-002-025 Production of thermospray paints for road marking using local materials.	146,275	\$123,000	137,145	409,333
RSMAL-006-001-034 Develop. of Manufacturing Processes for the Prod. of Polypropylene&Polyamide Fibres.			150,000	0

Water and Wastewater Treatment

RWATR-003-003-020 Treatment and disposal of sludge produced From Wastewater Treatment Plant	219,100	\$87,000	120,000	440,000
RWATR-004-003-021 Pollution Control of Industrial Effluents in roset branch Water Course	256,175	\$87,200	10,000	10,000
RWATR-005-002-026 Development of Cost Effective Technologies for a Sullage Conveyance System,& Sullage & Septage Treat	519,612	\$67,850	350,000	100,000
RWATR-006-002-029 Underground Water As A Complementary Source For Potable Water.	235,050	\$63,200	0	0

Total for Program : 2,729,218 \$305,250 780,145 1,435,933

GRAND TOTAL : 6,950,183 \$3,166,942 3,180,945 5,861,285

STC - BUDGET BREAKDOWN

NMAC-006-001-011	01/11/90	01/11/93	36.0	72,800	1,800	\$10,000	\$60,000	49,400	12,000	\$25,000	21,000	0	157,000	\$95,000
				46%	1%	11%	63%	31%	8%	26%	13%	0%	100%	100%
NMACH-008-003-012	24/07/90	24/07/93	36.0	66,450	3,250	\$15,000	\$117,000	40,000	12,000	\$20,000	34,600	0	156,300	\$152,000
				43%	2%	10%	77%	26%	8%	13%	22%	0%	100%	100%
MNACH-009-001-013	20/12/90	20/03/93	27.0	82,900	7,600	0	\$76,000	33,100	12,500	\$20,000	40,900	0	177,000	\$96,000
				47%	4%	0%	79%	19%	7%	21%	23%	0%	100%	100%
NMACH-007-001-014	02/01/91	02/07/92	18.0	35,300	5,900	\$10,000	\$105,000	38,000	10,000	\$18,000	27,300	0	116,500	\$133,000
				30%	5%	8%	79%	33%	9%	14%	23%	0%	100%	100%
RSMAL-003-001-015	05/12/90	05/01/92	13.0	9,300	1,200	0	0	56,200	1,500	0	2,100	0	70,300	0
				13%	2%	0%	0%	80%	2%	0%	3%	0%	100%	0%
RSMAL-002-001-016	01/02/91	01/02/92	12.0	12,900	0	0	0	111,000	5,000	0	16,000	0	144,900	0
				9%	0%	0%	0%	77%	3%	0%	11%	0%	100%	0%
NMACH-011-001-017	01/01/91	01/12/92	22.0	56,000	6,000	0	\$133,000	51,000	5,000	\$17,000	35,000	0	153,000	\$150,000
				37%	4%	0%	89%	33%	3%	11%	23%	0%	100%	100%
TCOMP-004-003-018	01/01/91	01/01/93	24.0	259,650	0	0	\$199,000	35,700	5,000	\$11,000	24,650	0	325,000	\$210,000
				80%	0%	0%	95%	11%	2%	5%	8%	0%	100%	100%
NMACH-010-004-019	01/20/91	01/02/93	24.0	88,000	3,000	0	\$87,495	53,200	25,500	\$24,000	55,150	0	224,850	\$111,495
				39%	1%	0%	78%	24%	11%	22%	25%	0%	100%	100%
RWATR-003-003-020	01/02/91	01/02/93	24.0	85,000	8,000	\$6,000	\$69,000	30,000	13,000	\$12,000	83,100	0	219,100	\$87,000
				39%	4%	7%	79%	14%	6%	14%	38%	0%	100%	100%
RWATR-004-003-021	17/02/91	17/08/93	30.0	88,400	0	0	\$66,200	35,000	18,000	\$21,000	114,775	0	256,175	\$87,200
				35%	0%	0%	76%	14%	7%	24%	45%	0%	100%	100%
NCMAT-002-002-022	03/03/91	03/03/92	12.0	59,595	9,660	0	\$38,000	6,000	15,000	\$13,000	181,890	0	272,145	\$51,000
				22%	4%	0%	75%	2%	6%	25%	67%	0%	100%	100%
TCOMP-005-001-023	15/05/91	15/07/93	26.0	106,200	12,000	\$8,000	\$90,000	25,500	20,200	\$22,000	30,500	0	194,400	\$120,000
				55%	6%	7%	75%	13%	10%	18%	16%	0%	100%	100%
NMACH-012-001-024	15/10/91	15/10/93	24.0	75,400	9,000	\$10,000	\$110,000	34,000	15,000	\$20,000	38,600	0	172,000	\$140,000
				44%	5%	7%	79%	20%	9%	14%	22%	0%	100%	100%

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RSMAL-004-002-025	01/10/91	01/04/93	18.0 0	40,115	0	0	\$108,000	35,800	35,060	\$15,000	35,300	0	146,275	\$123,000
				27%	0%	0%	88%	24	24%	12	24%	0%	100%	100%
RWATR-005-002-026	01/09/91	01/03/94	30.0	104,712	6,600	0	\$62,000	36,000	71,800	\$5,850	300,500	0	519,612	\$67,850
				20%	1%	0%	91%	7%	14%	9%	58%	0%	100%	100%
RLAKE-002-001-027	01/10/91	01/10/94	36.0	83,685	9,450	\$7,600	\$31,000	47,150	35,060	0	184,690	0	360,035	\$38,600
				23%	3%	20%	80%	13%	10%	0%	51%	0%	100%	100%
RLAKE-001-001-028	20/10/91	20/10/93	24.0	84,000	2,000	0	\$30,000	23,000	41,000	\$10,000	12,4000	0	274,000	\$40,000
				31%	1%	0%	75%	8%	15%	25%	45%	0%	100%	100%
RWATR-006-002-029	**	**	24.0	62,590	900	\$2,000	\$46,200	20,000	20,000	\$15,000	131,560	0	235,050	\$63,200
				27%	0%	3%	73%	9%	9%	24%	56%	0%	100%	100%
MNACH-013-001-030	15/10/91	15/04/93	18.0	88,000	24,000	0	\$110,000	20,000	10,000	\$15,000	170,000	0	312,000	\$125,000
				28%	8%	0%	88%	6%	3%	12%	54%	0%	100%	100%
NMACH-017-003-031	01/03/92	01/03/94	24.0	65,914	5,600	0	\$139,700	75,500	15,000	\$6,000	57,192	0	219,206	\$145,700
				30%	3%	0%	96%	34%	7%	4%	26%	0%	100%	100%
MNACH-016-001-032	**	**	36.0	0	0	0	0	0	0	0	0	0	0	0
			
NCMAT-003-002-033			12.0	0	0	0	0	0	0	0	0	0	0	0
			
RSMAL-006-001-034	**	**	24.0	0	0	0	0	0	0	0	0	0	0	0
			
TBIOT-016-001-035	**	**	36.0	0	0	0	0	0	0	0	0	0	0	0
			
RLAKE-003-001-036	01/03/92	01/03/93	12.0	31,832	4,300	0	\$2,200	3,000	8,480	\$2,000	211,009	0	258,621	\$4,200
				12%	2%	0%	52%	1%	3%	48%	82%	0%	100%	100%
RSMAL-007-001-037	**	**	36.0											

ANNEX F
SCIENCE AND TECHNOLOGY COOPERATION PROJECT
AWARDED SUBPROJECTS END USERS AFFILIATION

EU Affiliation	IDCODE	TITLE	LE BUDGET	DOLLAR BUDGET
	NCMAT-002-002-022	10th of Ramadan Factory for Sand Brick Development of Cement-Bonded Sand Bricks Productio 1 Contract(s)	272,145	\$51,000
	NMACH-004-001-001 NMACH-003-001-003	Abu Zaabal Company for Fertilizers & Chemical Modification of Prod. Tech.of Phosph. Acid in Abuz Local Manufacture of Water Treatment Chemicals Use 2 Contract(s)	164,784 172,180	\$148,557 \$63,840
	RWATR-003-003-020	Alex. General Org. for Sanitary Drainage Treatment and disposal of sludge produced From Was 1 Contract(s)	219,100	\$87,000
	NMACH-006-001-011 NMACH-007-001-014 TCOMP-004-003-018	Aluminium Company of Egypt Production of Metallurgical Alumina from Local Ore Production of Aluminium Fluoride From Fluosilicic Design, Develop, and Implem. of Computer Based pro 3 Contract(s)	157,000 116,500 325,000	\$95,000 \$133,000 \$210,000
	NCMAT-003-002-033	Build. Materials Organization & its Companies Development of Cement Production Technology 1 Contract(s)		
	NMACH-005-001-010	Canaltex Flooring Co. Locally Made Substitutes for Imported Asbestos and 1 Contract(s)	54,000	\$85,000
	TBIOT-006-001-005	Capacity Building Sub-Project Tissue Culutre Macromolecular Requirements 1 Contract(s)	150,800	\$127,800
	TCOMP-003-004-004	Edfina Co. Fo, Preserved Food Design and Application of Computer-Based Technolog 1 Contract(s)	325,000	\$160,000
	RSMAL-006-001-034	Egyptian Fiber Company(FECO) Develop. of Manufacturing Processes for the Prod. 1 Contract(s)		
	RWATR-004-003-021	El Gharbia Governorate Pollution Control of Industrial Effluents in roset 1 Contract(s)	256,175	\$87,200
	NMACH-017-003-031	El Nasr Co. for Fertilizers & Chem. Indust. Local Production of Anticking Chem. used in Treatm 1 Contract(s)	219,206	\$145,700

AWARDED SUBPROJECTS END USERS AFFILIATION

EU Affiliation	IDCODE	TITLE	LE BUDGET	DOLLAR BUDGET
	TBIOT-010-001-006	El Nasr Company for Pharmaceutical Chemicals Enzyme production for clinical diagnosis and Indus 1 Contract(s)	157,700	\$127,000
	NMACH-013-001-030	El Nasr Saline Co. Production of Magnesium Oxide from the Bittern Sol 1 Contract(s)	312,000	\$125,000
	NMACH-008-003-012	El-Nasr Casting Company Local Manufacturing of Grinding Mills 1 Contract(s)	156,300	\$152,000
	RLAKE-002-001-027	General Auth. for Aquatic Resources Develop. Aquaculture In Lake Manzalah	360,035	\$38,600
	RLAKE-001-001-028	Open Water Fisheries Development in Lake Manzalah 2 Contract(s)	274,000	\$40,000
	TBIOT-016-001-035	Ministry of Agric. & Land Reclamation Introduction of Bacillus thuringensis endotoxin gen 1 Contract(s)		
	NMACH-010-004-019	Miar Chemicals & Coatings Co. Production of Titanium Dioxide for Paints and Weld	224,850	\$111,495
	RSMAL-004-002-025	Production of thermospray paints for road marking 2 Contract(s)	146,275	\$123,000
	TCOMP-005-001-023	National Metallic Industries Co. Introduction of Computer Based Techn. to the New E 1 Contract(s)	194,400	\$120,000
	RWATR-005-002-026	Nawage Village, El Gharbia Governorate Development of Cost Effective Technologies for a S 1 Contract(s)	519,612	\$67,850
	RSMAL-001-001-009	New Settlements Appropriate Technology for Low-Cost self-Building 1 Contract(s)	245,150	\$54,500
	TCOMP-001-001-008	Oriental Weavers Develop.of Jacquard Looms with a Device to Transla 1 Contract(s)	237,000	\$155,000
	RSMAL-003-001-015	Rural Community - New Settlements Development of Appropriate Unit for High Quality	70,300	\$0
	RSMAL-002-001-016	Development of Appropriate Solar Unit for Vegetabl 2 Contract(s)	144,900	\$0
	RWATR-006-002-029	Sharkeya and Gharbeya Governorates. Underground Water As A Complementary Source For 1 Contract(s)	235,050	\$63,200

AWARDED SUBPROJECTS END USERS AFFILIATION

EU Affiliation

IDCODE	TITLE	LE BUDGET	DOLLAR BUDGET
NMACH-009-001-013	Sinai Company for Manganese Production of Moulding and Medical Plaster	177,000	\$96,000
NMACH-011-001-017	Production of Activated Bentonite from Local Ores 2 Contract(s)	153,000	\$150,000
NMACH-002-001-007	Societe Generale d'Industrie du Papier(Rakta) Upgrading Egyptian Kaolin 1 Contract(s)	171,200	\$110,000
TCOMP-002-001-002	STIA and VESTIA Companies Integrated Computerized Control in Textile Industry 1 Contract(s)	308,900	\$95,000
NMACH-012-001-024	Tawakol Metal Industries Production of High Quality Castings For Different 1 Contract(s)	172,000	\$140,000
NMACH-016-001-032	The Egyptian Starch and Glucose Manuf. Co. Development of the Processing Methods for the Prod 1 Contract(s)		
RLAKE-003-001-036	The Governorates, of Port Said, Northern Sain Development of a defence mechanism against blooms 1 Contract(s)	258,621	\$4,200

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ANNEX G

PRINCIPAL R&D CENTERS PARTICIPATING IN STC R&D CONTRACTS

National Research Center
Central Metallurgical Research & Development Institute
Electronics Research Institute
Petroleum Research Institute
National Institute of Oceanography & Fisheries
EGYPTALEN
Egyptian Geological Survey & Mining Authority
General Organization for Industrialization
Alexandria General Organization for Sanitary Drainage
Environmental Protection Center, Suez Canal University
Desert Research Institute
Design and Urban Planning Center
Tebbin Institute for Metallurgical Studies
National Center for Social and Criminological Research
Cairo University - various facilities
Ain Shams University - Engineering and Agriculture Faculties
Alexandria University and 15 other universities

ANNEX H
STC STEERING COMMITTEE MEMBERSHIP

NAME	TITLE
1. Prof. Adel Ezz	Minister of Science & Technology
2. Dr. Aly Heblesh	President of the ASRT
3. Dr. El-Sayed Hassanein	President of Menoufeya Univ.
4. Dr. Ahmed Gewely	Governor of Ismailia
5. Dr. Abdel Wahab Ahmad	Governor of Sharkeya
6. Dr. Salah El-Dien Morsy	General Secretary of the Supreme Council of Universities
7. Dr. Mahmoud Saada	Vice President of ASRT
8. Dr. Hamdy Abdel-Aziz	Vice President of ASRT for Scientific Relations
9. Dr. Hassan Selim	First Undersecretary, MIC
10. Chem. Sabry Aglan	Plastic Pipe Manufacture Co.
11. Eng. Adel El-Samahy	Chairman, Edfina Preserved Food Co.
12. Mr. Mohamed Farid Khamis	Chairman, Oriental Weavers Co.
13. Dr. Nabil Eid	Chairman, Rug Art Co.
14. Dr. Hussein Abdel-Rahman	President, NRC
15. Dr. Ahmed S. El-Nokrashy	Executive Director, STC
16. Eng. Adel Gazarien	President, Egyptian Industrial Union
17. Dr. Mohamed Mokhtar El-Halwagy	Executive Manager Technical, Technology & Consultants Fund
18. Mr. Abdel-Hamid Abdel-Hamid	Undersecretary, Ministry of Scientific Research
19. Mr. Farag El-Dorry	General Secretary, Shoura Council
20. Dr. Moustafa Thabet	Arab Organization for Indus.
21. Mr. Marc Madland	USAID

**ANNEX I
PROJECTS VISITED**

Project No.	Project Title	Site Visited	Lab Visited
01	Modification of Production Tech. of Phosph. Acid	Abu Zal Fertilizer Company	Central Metallurgy Res. Dev. Inst.
02	Computerized Control in Textile Industries.	Stira Co. Alexandria	_____
03	Local Manufacture of Water Treatment Chemicals	Abu Zabal Fertilizer	_____
04	Computer - Based Technology in Food Industries	Edfina Co. Alexandria	Fac. Eng. Cairo Univ.
06	Enzyme Production for Clinical & Industrial App.	_____	National Res Center
07	Upgrading Egyptian Kaolin	Dr. Aglan Pipe Mfg. Co.	CMRDI Tebbin
08	Dev. of Jacquard Looms with a device to translate Designs stored on Magnetic discs to mechanical action	Oriental Weavers Eng. Reda Abd El-Baky	Electronic Res. Inst. Prof. Esmat A. Fatah Abd Allah NRC
10	Local Substitute for Imported Asbestos & Copolym. in vinyl tile production	_____	Polym. Lab NRC
12	Local Manufacture of Grinding Mills	El-Nasr Casting Co.	Dept. of Metallurgy Cairo Univ.
18	Design, Dev. & Implem. of Computer based process Cent. System for EGYPTALUM	EGYPTALUM Eng. Soliman Reda Ail	_____
19	Prod. of Titanium dioxide for Paints & Welding Rods Industries from local ores	Misr Chemical Chem. Amer Afifi	CMRDI Prof. Samir Zaki ElTawil
22	Dev. of Cement bonded Sand bricks. Prod. lines to prod. cement-free sand bricks	10th of Ram. Sand & Bricks Company	Fac. of Eng. Cairo Univ.

25	Prod. of thermos spray paints for road marking using local materials	Misr Chem. & Coating Co. Chem. Afifi	NRC Prof. Badran Badran
26	Sewage & Sewage Disposal Nawage Village	Nawage Vill.	_____
27	Aquaculture in Lake Manzalah	_____	Nat'l Inst. of Ocean- ography
28	Open Water Fisheries on Lake Manzalah	_____	Nat'l Inst. of Ocean- ography

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ANNEX J

"CONDITIONAL GRANT" FOR R&D

When asked about industry sharing the cost of R&D work, some of the executives stated that they might be willing to do that if the services offered was relevant and of value. They responded favorably to the notion of a conditional grant which, however, would be paid back, with some premium if necessary, after the successful application of the R&D work undertaken.

STC may wish to consider supporting ventures by Egyptian companies in need of R&D assistance by offering need-based promotional assistance and conditional grants to meet part of project cost. This could provide some built-in protection against risks associated with market-oriented R&D. Manufacturing based on the R&D-developed technology could be by the company or by sub-contractors, or by their licensees. Institutions or non-manufacturing companies could act as sub-contractors in the R&D or testing phases of the project. The project would involve the development, through R&D, of an innovative product or process which would benefit the national economy; would involve financial exposure and projected returns from commercialization which are commensurate with the risks; would involve a project cost below a pre-determined ceiling (say, not exceeding \$1 million with an STC contribution up to 50 per cent in \$ and LE) and which are adjudged to have significant commercial potential. Project expenditure would include salaries, materials and utilities, costs of consulting services, sub-contracts and data processing, necessary travel and administrative expenses, pre-marketing expenses and special purpose equipment but not standard catalog equipment or facilities used for production purposes which the proposer would be expected to own or provide.

The STC share of project costs of up to 50 per cent would be in the form of a conditional grant which the company would pay back to STC as a pre-negotiated percentage of revenues arising from the project upon commercialization. Such negotiated payments might be limited to a maximum (e.g. 200 percent of the STC share in the project). STC would assume it's share of risk: no commercialization, no payments.

This scheme could be expanded, of course, to cover R&D contracts between Egyptian firms and U.S. contractors. While such an expansion would be beyond the scope of the existing STC program, which aims at putting Egyptian R&D capacity to work on national problems, it could be of value to a broader program aimed at augmenting Egyptian industrial productivity. In considering any such expansion beyond Egyptian R&D institutions, care would need to be exercised to assure against the potential of replacing Egyptian R&D with U.S. R&D.

ANNEX K

PIO/T 263-0140-
Page 4 of 41 pages

SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (263-0140)

MASTER EVALUATION SCOPE OF WORK
FOR ALL COMPONENTS

CONTENTS

- I Introduction
 - * Brief Overview of the Project
 - * Overview of the Evaluation Effort
- II Phase I - Science & Technology for Development Project
 - * Description
 - * Evaluation Questions and Issues
- III Science & Technology Cooperation Project
 - * Description
 - * Evaluation Questions and Issues
- IV Schistosomiasis Research Project
 - * Description
 - * Evaluation Questions and Issues
- V Energy Conservation & Efficiency Project
 - * Description
 - * Evaluation Questions and Issues
- VI Energy Manpower Development Project
 - * Description
 - * Evaluation Questions and Issues
- VII EVALUATION REQUIREMENTS
 - * Methodology
 - * Reporting
 - * Contract Duration & Scheduling
 - * Overall Team Composition
 - * Budgeting Information

I. INTRODUCTION

A. BRIEF OVERVIEW OF THE PROJECT

According to the 1985 Project Paper, the overall goal of the Science and Technology for Development (STD) Project is to improve the welfare and productivity of the Egyptian people. The project purpose is to enable the Egyptian S&T community to solve national development problems and constraints through applied research and technology in the fields of health, productivity, and science and technology. The STD Project seeks to:

- Maximize the contribution of science and technology to Egyptian socioeconomic development;
- Generate and extend interdisciplinary and inter-institutional cooperation;
- Develop, introduce, and transfer technologies to meet important and well-defined end-user needs.

The project calls for the integration of Egyptian and AID resources to solve higher level and more complex problems in health, land-use, energy and industrial productivity. The project's primary focus is on development problem solving and technology transfer to meet end-user needs.

The STD Project is an umbrella activity consisting of separate components described in separate Project Papers, funded by separate Project Agreements and implemented by separate ministries. Each component is comparable to an individual AID project.

B. OVERVIEW OF THE EVALUATION EFFORT

This scope of work covers the first evaluation for the umbrella Science and Technology for Development (STD) Project and each of its four currently active components. The overall purpose of the evaluation is to assess the original project designs and their relevance to current Agency and Mission strategic objectives as well as to evaluate progress toward achievement of project purposes. The evaluation will make recommendations for adjusting

or redirecting project activities so they contribute more toward achievement of strategic objectives as well as recommendations for improving the project implementation. While it is too early to determine the impact of project funded activities, the evaluation will assess the potential future impact of project activities on project goals and strategic objectives.

Since each of the four components is being implemented independently by different ministries assisted by different contractors, a separate evaluation report will be produced for each component. In addition to evaluation reports for each component, a fifth evaluation report will be produced covering the potential contribution of the S&T activities on strategic objectives as well as the components which produced the design and pre-implementation process used in Phase I of the STD Project.

The separate evaluation issues and questions for each of the five evaluation reports are presented in Sections II through VI of this Master Scope of Work. To reduce USAID's staff intensity and achieve economies of scale, one contractor will be hired to produce the five evaluation reports during the second quarter of FY 1992. The contractor shall identify one individual as the overall Contract Chief-of-Party and specify individual Team Leaders for each of the five evaluation reports. It is expected that some members of the contractor's overall team will have input into more than one of the evaluation reports. Section VII discusses evaluation requirements including methodology, reporting, scheduling, team composition, and budget.

II. PHASE I OF SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (STD) PROJECT 263-0140

A. DESCRIPTION

The STD Project rests squarely on the March 1985 USAID/Cairo S&T Strategy which followed a major Egyptian-U.S. assessment of S&T in 1983-84. USAID's first generation S&T activities focused on building S&T infrastructure. The second generation sought to involve the Egyptian S&T community in a wide range of relatively general development problems. The 1985 Strategy advocated a third generation of activities tightly focused on a limited number of

well-defined, end-user identified needs. The Strategy identified three basic areas: Critical Childhood Diseases; S&T Cooperation and Productivity, which had two foci - land use (planning) and energy (management and training).

In July 1985, USAID/Cairo approved the Project Paper for Phase I.

USAID and the GOE signed the Phase I Project Agreement (ProAg) in March 1986 obligating \$3M for the design of the individual project components as well as financing pre-project start-up of implementation activities. Phase II is the implementation of each of the components.

Analyses and consultant services funded under Phase I, were used to prepare separate Project Papers for five components. In FY 1987, USAID approved the first component Project Paper for the S&T Cooperation (STC) Project (263-0140.1); USAID and the GOE signed the STC ProAg in August 1987. With assistance from the STD consultants and the GOE, USAID completed Project Papers in FY88 for four other components, three of which were approved by the USAID Director (Schistosomiasis Research Project - SRP, Energy Conservation and Efficiency Project - ECEP, and Energy Manpower Development Project - EMDP). The USAID Director did not approve the Project Paper for the Land Use Planning Project. In late FY 1988, USAID and the GOE signed separate Project Sub-grant Agreements for SRP, ECEP, and EMDP. During FY89 and FY90, Phase II started in earnest as all four approved components moved into active implementation.

Current financial information for the STD umbrella project and the four component projects' summarized below:

Project Number	Project Name	ProAg Signing Date	LOP funding \$ mill.	Oblig. thru FY90	Spent by 9/91
263-140	Phase I S&T for Devel.	3/31/86	3.00	3.00	2.67
263-140.1	S&T Cooperation	7/30/87	36.00	9.44	3.68
263-140.2	Schistosomiasis Research	9/27/88	39.65	18.00	8.21
263-140.3	Energy Conservation and Efficiency	9/27/88	49.50	21.00	5.30
263-140.4	Energy Manpower	9/27/88	8.60	8.60	2.31
	TOTAL		136.75	55.04	22.17

An overview of component design and start-up implementation activities is described below.

S&T Cooperation:

- STD funded consultant services to assist USAID with project design.
- STD funded early support for the Egyptian National Scientific and Technical Information Network (ENSTINET).
- Contract to provide Management and Technical Assistance (M/TA) for establishing grants management program and management information system.

Schistosomiasis Research:

- STD funded buy-in to AID/W contract with Medical Service Corporation International (MSCI) to: assist USAID and GOE with project design and to provide interim M/TA for initiating project implementation activities for a period of about one year from just prior to final signing of SRP ProAg until after the award and mobilization of a competitive contract for a long-term M/TA.
- STD funded a two year contract with the University of Lowell to establish a facility at the GOE Theodore Bilharz Research Institute (TBRI) to produce the biological materials (schistosomes) needed for schistosomiasis research.

Energy Conservation and Efficiency:

- STD funded a buy-in to AID/W's contract with RCG/Hagler Bailly to assist USAID and GOE with project design and to provide interim M/TA for initiating project implementation activities for a period of about one year prior to award and mobilization of a competitive contract for a long-term M/TA.

Energy Manpower Development:

- STD funded a buy-in to AID/W's contract with the Institute for International Education (IIE) to assist USAID and GOE with project design and to initiate project implementation

activities for a period of about one year prior to award and mobilization of a competitive contract for a long-term M/TA.

Land Use Planning:

- STD funded a buy-in to AID/W contract with Dames and Moore to assist USAID and GOE with project design.

B. EVALUATION QUESTIONS AND ISSUES

1. Strategic Relevance of STD Activities

- The AID Administrator has identified four initiatives; the family, partnership for (private sector) business and development, democratization, and the environment. USAID/Cairo has set strategic objectives (to be explicitly specified by start of the evaluation). What STD sub-activities are making the strongest/weakest contribution to these initiatives and objectives? What types of S&T activities would make a stronger contribution? How can the contribution be enhanced?
- In what ways do the STD activities contribute to the goals and objectives of the GOE? What types of S&T activities would make a stronger contribution? What STD sub-activities are making the strongest/weakest contribution? How can the contribution be enhanced?
- How well do the designs and implementation of the four STD component projects contribute to Egyptian development and to the overall goal and purpose stated in the STD Project Paper? What STD sub-components of each activity are making the strongest/weakest contribution? How can the contribution be enhanced?
- Based on the above, what changes should be made? What sub-components should be enlarged or reduced or even eliminated?

2. Design of Umbrella Project and Component Activities

- The approved 1985 STD Project Paper, Authorization, and 1986 ProAg implied a commitment of AID to provide \$131.6M for a long-term (at least eight year) S&T Program. The GOE agreed in the ProAg to provide LE\$54.7M to the S&T program. By signing the initial umbrella STD documents, did AID and the GOE tend to "lock" themselves into a set of S&T activities and, thus, unnecessarily limit their flexibility to shift resources to other S&T topics or out of S&T altogether? Did AID and the GOE have sufficient background information from the various S&T assessments conducted in the early 1980's to make sound long range decisions on what types of S&T activities to pursue? Is limiting flexibility a serious weakness of umbrella projects?
- The STD umbrella project funded consultant design teams for the five component projects. What are the advantages and disadvantages of using this approach as compared to using funds from Project Development & Support (PDS) or USAID/Cairo's Technical Services and Feasibility Studies Project (263-0102)? Is this approach inconsistent with any AID policies or regulations?
- What lessons were learned from the STD umbrella project experience that will benefit future development projects?

3. Start-Up Implementation Activities

- The STD umbrella approach resulted in USAID and its consultants simultaneously designing SRP, ECEP, EMDP, and Land Use projects in 1987/88 and then starting implementation of SRP, ECEP, and EMDP in early FY89. What are the advantages and disadvantages of designing and starting implementation of three or four projects at the same time? How can the advantages be enhanced and the disadvantages minimized?
- The start-up implementation activities of the four components were funded from the umbrella STD project using the AID/W contract buy-in mechanism. Thus, implementation could start before component funds became available with

the satisfaction of the Conditions Precedent to Initial Disbursement and before mobilization of competitively selected long-term M/TA contractors. In fact, implementation of the SRP component started even before the SRP ProAg was signed. What are the advantages and disadvantages of using umbrella project funds for initial start-up implementation of component projects? How can the advantages be enhanced and the disadvantages minimized? Is this approach inconsistent with only AID policies or regulations?

III. SCIENCE AND TECHNOLOGY COOPERATION (STC) PROJECT (263-0140.1)

A. DESCRIPTION

1. Overview

The S&T Cooperation Project (263-0140.1) is designed to redirect Egyptian S&T programs to solving priority development problems having the greatest effect on end-users, and to building S&T capacities in selected technologies. The Project funds research contracts in pre-defined, high priority problem categories. Egyptian universities, research centers, and private and public sector firms are eligible to compete for research contracts in response to advertised "Requests For Proposals" (RFPs) which are developed in close collaboration with end-users. End-users include individual companies or groups of producers.

The Project is divided into three major components. The National Research Program (NRP) focuses on solving limited, but well-defined national development problems. The Local Research Program (LRP) addresses local/rural development problems identified by, and associated with, specific governorates or regions. The Advanced Technology Program (ATP) builds on advanced applications in biotechnology and computer-based technology.

The Project is implemented by a semi-autonomous STC Secretariat which is housed in the Egyptian Academy of Scientific Research and Technology (ASRT). Policy guidance is provided by the STC Steering Committee composed of senior representatives from the Egyptian S&T and End-User communities.

2. Implementation Start-up

Relatively limited implementation progress was made during the first year after the signing of the ProAg in August 1987 which obligated \$8.04 million. At its first meeting in July 1988, the Steering Committee agreed to advertise for the STC Executive Director position and selected problem areas in each of the three STC components: NRP - Industrial Minerals and Chemicals and Construction Materials; LRP - Water/Wastewater and Small Scale Industry; ATP - Micro-electronics and Biotechnology. While no funds had been expended by October 1988, an Executive Director had been hired, Secretariat staff were being recruited, and efforts were underway to obtain contract Management/Technical Assistance (M/TA) from an 8(a) firm.

By January 1989, the Steering Committee had met four times, 18 research proposals had been received, several Secretariat staff had been hired, but still no AID funds had been expended. After contracting delays, AID awarded a two year, \$968,000 M/TA contract to IDEA in February 1989. IDEA was responsible for assisting the Secretariat with the establishment of operating procedures and a management information system (MIS) as well as providing consultants to undertake background research in the selected problem areas. The IDEA resident project manager (RPM) arrived in April and shortly thereafter a number of short-term consultants starting arriving.

By August 1989, operating procedures had been established meeting an AID Condition Precedent to disbursement of funds for research contracts. However, by then efforts were underway to remove the IDEA resident project manager (whose CV had been approved by the Secretariat and AID) for lack of performance. The RPM resisted these efforts, but was finally removed in November 1989. The new IDEA RPM arrived in early 1990 and served the project effectively through the remainder of the contract, which ended in June 1991.

In June 1990, The Secretariat awarded an incrementally-funded (\$1.7M for the first two years) host country Procurement Service Agent (PSA) contract to American Manufacturers Export Group (AMEG, 8a). Under the contract, AMEG will procure up to \$5 million in scientific equipment required for implementation of the research contracts.

The Secretariat's Executive Director and his 20 person staff manage the day to day operations of the Project. The Secretariat staff, which are paid with USAID allocated funds, are not current GOE employees (they may be GOE employees who are currently on leave without pay status). The STC Secretariat includes a Technical Liaison Office (TLO), with a branch TLO in the Tenth of Ramadan City, which is responsible for identifying End-Users and appropriate S&T development problems for research as well as to marketing research results. For each problem area, the Project works with End-Users and identifies specific research topics. The Secretariat hires Egyptian and American experts to conduct background studies on each research topic. Working from the background studies and in close collaboration with End-Users, the Secretariat develops a draft RFP which is reviewed by technical experts and the End-User. After the End-User approves the final RFP, the Secretariat advertises the RFP and distributes it to interested parties.

Upon receipt of proposals, the Secretariat convenes Review Panels of technical experts, chaired by the End-User. In response to comments from the Review Panels, the selected Principle Investigators (PIs) submit "Best and Final Offers" which are the basis for negotiation and ultimate award of the research contracts.

The Secretariat awarded the first eight research contracts in Jan./Feb. 1990 for a total of about \$1.6M. The grants cover the salaries, imported and local research equipment and supplies, as well as collaboration with international consultants.

In support of Project objectives and to promote the STC research program, the Secretariat also conducts a variety of workshops and seminars as well as publishing and distributing newsletters and other documents.

The project prepared 48 feasibility studies for labor intensive small scale agricultural/industrial sub-projects and distributed these to about 2000 young entrepreneurs. The STC is demonstrating three of these sub-projects in the 6th of October City.

The project also supports the Egyptian National Scientific and Technical Information Network (ENSTINET) and its extension to regional universities. ENSTINET was formally established in 1983

and received early financial support under the USAID Applied S&T Project (263-0016) and from the S&T for Development Project (263-0140).

3. Current Status

As of September 1991, STC had completed four research contract competition cycles and awarded 30 research contracts representing commitments of AID funds totalling \$2.9M plus LE 7.2M. In addition, research contractors had already contributed LE 1.3M (in kind) to STC research efforts. Furthermore, end-user companies had contributed LE 1.0M (including LE 0.2M in cash). AMEG had delivered almost \$1.0M worth of research commodities to the principal investigators and had ordered an additional \$500,000.

The topical breakdown of the first 30 contracts is as follows:

- 2 Biotechnology
- 5 Computer Technology
- 1 Construction Materials
- 12 Industrial Chemicals and Minerals
- 4 Small Scale Industries
- 4 Water and Wastewater Treatment

In September 1991, the STC Secretariat was involved in various stages of two more contract competition cycles and, by January 1992 is expected to award 10 additional contracts.

B. EVALUATION QUESTIONS AND ISSUES

1. The STC Secretariat

- Are administrative structures and procedures effective and efficient? Do they meet all AID and GOE requirements?
- Is the Secretariat appropriately housed, equipped, staffed and budgeted?
- Are administrative, financial, and commodity control systems adequate to meet GOE and USAID monitoring requirements?

- Is the contract award process (from Background Studies through Request for Proposals (RFPs), Peer Review Panels, and Best and Final Offers, to Contract Award) working effectively and efficiently? Productive sector end-users with real technology problems need rapid solutions; what can be done to accelerate the process?
 - Has the Secretariat developed effective linkages with end user communities and with research organizations? Is the STC promoted effectively?
 - How has the IDEA contract contributed to the Secretariat? Is additional technical assistance required?
 - To what extent is the achievement of STC's project objectives being facilitated by the existing project organizational and administrative procedures, including participation of other organizations?
 - What steps should be taken to improve the overall functioning of the Secretariat?
 - Are the 48 feasibility studies for labor intensive small scale enterprises contributing to project objectives?
 - What should be done to ensure continued strengthening of linkages between industry and scientists after AID funding for the Secretariat ends in 1996?
2. Research Contracts Program
- Are the accounting, reporting, and the Research Contract requirements clearly understood by the Principal Investigators?
 - Are Principal Investigators receiving required (US and Egyptian) commodities and other inputs in a timely fashion? What can be done to improve the procurement process?
 - What are the strengths and weaknesses of the STC as viewed by private sector companies? public sector companies?

local governmental units? and potential principle investigators?

- Are research contracts sufficiently focused on real development problems? Should steps be taken to better focus the research contracts?
- What is the likelihood that the research contracts will solve the end user's specific development problem? What can be done to increase the likelihood?
- Are research contracts building sustainable linkages between scientists and end users? What can be done to strengthen the linkages? What can be done to generate greater interest of scientists in STC?

3. The Effectiveness and Sustainability of ENSTINET

- Are ENSTINET's organizational and administrative procedures effective and efficient?
- Does ENSTINET have appropriate staff, budget, and equipment? Are revenues and expenditures balanced? Is the staff suitably qualified? Are the hardware and software systems appropriate?
- Will ENSTINET become a sustainable agency when USAID's assistance phases out after FY93? What steps should be taken now to improve its sustainability?
- Are administrative and financial control systems adequate to meet GOE and USAID monitoring requirements?
- To what degree is ENSTINET meeting the technical and scientific information needs of Egypt?
- What steps should be taken to improve the long term functioning of ENSTINET?

4. USAID

- Is USAID effectively fulfilling its STC monitoring and accountability responsibilities? Has USAID effectively

communicated its requirements to the Secretariat? Does HRDC/S&T have sufficient staff levels and skills to fulfill its project monitoring responsibilities?

- What changes should USAID make to better insure achievement of STC's purposes and goals or to improve implementation of STC?
- When and by what amount should the obligation level of \$9.44M be increased? If additional funds are not forthcoming, what will happen to the STC project?

5. Overall

- Is the project on a track leading to achievement of its goal and purpose? What changes are needed?
- How will the positive aspects of the project be sustained when AID's assistance ends in 1996? What changes are needed now to enhance sustainability?
- How is the project contributing to the Administrator's initiatives, USAID's strategic objectives and GOE S&T priorities? What can be done to enhance the contribution?
- What policy or program changes could the GOE or AID make to facilitate accomplishment of project goal and purpose?

IV. SCHISTOSOMIASIS RESEARCH PROJECT (SRP) 263-0140.2

A. PROJECT DESCRIPTION

1. Overview

The primary purpose of SRP is to control schistosomiasis by developing tools, methods and information through directed research. The secondary purpose is to improve the biomedical research capability of existing medical research institutions to conduct practical, control oriented research.

The ten year, \$36M SRP makes grants for pre-defined high priority research to Egyptian universities, research centers, and U.S. private and public sector groups. Research grants focus on six interrelated research areas: vaccine development; improved diagnostic methods; better chemo-therapeutic regimens; epidemiology of schistosomiasis; socio-economic factors that affect the disease; and, operations research to develop systems for delivering appropriate interventions. Egyptian and U.S. investigators collaborate actively in joint research projects. Young Scientist (YS) grants are developing a new generation of Egyptian schistosomiasis research scientists.

2. Project Implementation Start-up

STD Project funded a buy-in to the AID/W's Vector Biology Control (VBC) contract with Medical Service Corporation International (MSCI) to provide consultant services to assist the Ministry of Health (MOH) and AID with the design of SRP. In June 1988, USAID's Director approved the SRP Project Paper, with AID Life-of-Project funding of \$36M. In mid 1988, USAID used STD funds for a new buy-in with MSCI to provide interim assistance to MOH with the task of organizing the SRP Secretariat and developing the technical, financial and administrative procedures needed to implement the SRP grants program.

USAID signed the initial SRP Subgrant Agreement (ProAg) with the GOE in September 1988 obligating \$10M. The ProAg was amended in June 1989, increasing the obligated amount to \$18M. SRP is the largest schistosomiasis research activity worldwide.

Since project implementation actually started before the signing of the initial ProAg, the project got off to a rapid start. In December 1988, USAID used STD funds to award a \$830,000 sole source contract to the University of Lowell to assist the GOE Theodore Bilharz Research Institute (TBRI) in establishing a biological materials facility. Within a year the facility was providing researchers schistosome worms and cercariae. In April 1991, USAID used SRP funds to amend the Lowell contract extending it to five years and increasing the funding level \$1.5M.

In April 1989, USAID signed a two year, \$2M Participating Agency Services Agreement (PASA) with the U.S. Naval Medical Research Unit Three (NAMRU-3) in Cairo. NAMRU-3 immediately started

helping Egyptian scientists develop collaborative research proposals for SRP funding. NAMRU-3 also is providing training on scientific techniques and procuring research supplies. In 1991, the PASA agreement was augmented by \$1.4M and extended for two more years.

After successful completion of procedures, grants manual, and financial plan, AID provided funds to the SRP Secretariat in April 1989. In August 1989, USAID awarded a competitive contract to MSCI for long term management/technical assistance (M/TA) for the SRP. Since MSCI had assisted with the SRP design and implementation start-up, project continuity was maintained. As part of its contract, MSCI is responsible for providing technical and management assistance to the SRP; for procuring SRP commodities (mostly research equipment for grantees), training, and consultants; and for administering grants to collaborating U.S. research institutions.

Egyptian scientists (with assistance from NAMRU-3 collaborators), developed the first cycle of research proposals and submitted them to the SRP Secretariat in July 1989. The proposals were reviewed by joint Egyptian-American Technical Review Panels and revised accordingly. After budget negotiations, the first cycle research grants were formally awarded in November 1989. The first cycle included eight full grants (for a total of about \$2M) and three Young Scientist grants (for \$60,000).

3. Current Status

The SRP research grants program has continued making rapid progress. By September 1991, the MOH SRP has awarded 46 research grants; 29 full grants (for about \$9M) and 17 Young scientist grants (for about \$340,000). In support of these grants, MSCI had placed \$3.3M in orders for equipment; over \$1.6M in equipment was delivered to SRP by September 1991.

The SRP has held two highly successful Technical Symposia. The first Symposium in October 1990, which focused on vaccine development and improved diagnostics, attracted over 259 Egyptian and international scientists. The scientists voiced confidence that vaccine agents for schistosomiasis would be developed by the project completion date. It became clear at the second Symposium

in May 1991, that the SRP annual symposia had become a major event among international schistosomiasis scientists.

In January 1991, MSC I hired two independent consultants, Paul Basch and Gary Roderick, to conduct an assessment of SRP. This internal assessment documented SRP's early successes and made a number of recommendations for improving the project. The SRP Secretariat and USAID carefully reviewed all the recommendations and implemented those that would clearly improve the project.

B. EVALUATION QUESTIONS AND ISSUES

1. The SRP Secretariat

- Is the Secretariat appropriately housed, staffed, equipped, and budgeted?
- Are administrative structures and procedures effective and efficient? Is the grants award and management process working effectively and efficiently? Are there adequate mechanisms for curtailing grants that are not progressing satisfactorily? Do the structures and procedures meet all AID and GOE requirements?
- Are administrative, financial, and commodity control systems adequate to meet all GOE and USAID monitoring requirements?
- To what extent is the achievement of SRP project objectives being facilitated by the existing project organizational and administrative procedures, including participation of other organizations?
- Is the balance of resources among the six SRP research areas appropriate? How should the balance be shifted in the later stages of SRP to optimize achievement of overall goals.
- Is the grants program adequately advertised? Is the project publicized effectively?

2. Research Grants Program

- Are Principle Investigators receiving required (US and Egyptian) commodities and other inputs in a timely fashion? What can be done to improve the procurement process?
- What are the strengths and weaknesses of SRP as viewed by the Principle Investigators? Are the accounting, reporting, and administrative requirements of Research Grants clearly understood by Principal Investigators?
- Is the research grants program leading to optimum collaboration between Egyptian scientists and their American "collaborators"? What can be done to improve collaboration?
- Is the SRP improving coordination and collaboration among the various Egyptian scientists participating in the project? What can be done to improve coordination and collaboration?
- What are the major advantages and disadvantages of the Young Scientists program? Should the program be increased or curtailed? What can be done to improve the program?
- Do grants include sufficient training funds to enable grantees to learn new scientific techniques? How can the balance between U.S. and Egyptian training be improved?
- Are research grants sufficiently focused on truly promising avenues of research? Should steps be taken to better focus the research grants?
- What evidence is there that research grants will indeed lead to improved tools for schistosomiasis control? What can be done to increase the likelihood of positive results?
- Are research grants building sustainable linkages between Egyptian and American scientists? What can be done to strengthen the linkages?

3. Contractors (MSCI and Lowell)

- What are the strong points and weak points of MSCI and Lowell's performance under their contract? What can be done to enhance the strong points and improve the weak points?
- Is MSCI effectively and efficiently procuring SRP commodities, training, and collaboration with U.S. scientists? What can be done to improve procurement?
- Are the MSCI and Lowell contracts adequately focused on SRP objectives and goals? What can be done to improve the contracts?
- Are the relationships and communications between MSCI/Cairo and the MSCI Home Office appropriate? Is the balance of responsibilities and resources between the two MSCI offices appropriate?
- Are the relationships and communications between Lowell and Cairo (Secretariat, TBRI, USAID, MSCI) effective?
- Are MSCI and Lowell providing effective assistance to SRP? What overall improvements should be made?

4. NAMRU-3

- What are the strong points and weak points of NAMRU-3's SRP performance under their PASA? What can be done to enhance the strong points and improve the weak points?
- Is NAMRU-3 providing effective scientific collaboration and technical assistance to SRP? What improvements should be made?
- Is NAMRU-3 effectively and efficiently procuring, storing, and providing access to commodities funded under the PASA?
- Is NAMRU-3 effectively and efficiently providing training to the SRP grantees? What improvements should be made?

5. USAID

- Is USAID effectively fulfilling its SRP monitoring and accountability responsibilities? Has USAID effectively communicated its requirements to the Secretariat, MSCI, NAMRU-3, and Lowell University? Does HRDC/S&T have sufficient staff levels and skills to fulfill its project monitoring responsibilities? What improvements should be made?
- What changes can USAID make to improve implementation of SRP?
- Should the AID obligated amount of \$18M be increased? If so, when and by what amount? If additional funds are not forthcoming, what will happen to SRP?

6. Overall

- Is the project on a track leading to achievement of its goal and purpose? What changes are needed?
- How will the positive aspects of the project be sustained when AID's assistance ends in 1996? What changes are needed now to enhance sustainability?
- How is the project contributing to the Administrator's initiatives, USAID's strategic objectives and GOE S&T priorities? What can be done to enhance the contribution?
- What policy or program changes could the GOE or AID make to facilitate accomplishment of project goal and purpose?

V. ENERGY CONSERVATION AND EFFICIENCY PROJECT (ECEP) 263-0140.3

A. PROJECT DESCRIPTION

1. Project Overview

The ECEP Project's two purposes are: 1) to promote and accelerate the adoption of improved commercial technologies, processes, and practices in order to save energy and increase energy efficiency;

and 2) to improve Egyptian institutional capabilities, particularly in the private sector, for promoting and implementing energy-saving and productivity-enhancing investments.

The initial project design provides private and public sector companies with technical assistance and funds (loans and grants) for the implementation of up to 60 applications (sub-projects) of energy-efficient technologies. The loan aspect, which was to operate through the banking sector, was later dropped. Project grants for energy-efficient technologies are split about 50-50 between the private and public sectors. While AID's policy strongly favors encouragement of the private sector, the public sector in Egypt is clearly the largest energy user and offers by far the best opportunities for energy conservation. Public sector companies in the metals, chemicals and cement industries were selected for initial ECEP participation, later, food and textile companies were added. All private sector industrial and commercial companies in Egypt are eligible for participation.

The Tabbin Institute for Metallurgical Studies (TIMS) of the Ministry of Industry is implementing the public sector applications, while the Cairo University, Development Research and Technological Planning Center (DRTPC) is handling the private sector. The Federation of Egyptian Industries (FEI) is responsible for promoting ECEP among Egyptian business enterprises.

By implementing the project, TIMS, DRTPC, and FEI will improve their ability to promote, identify, engineer, install, operate and maintain energy-efficient technologies. ECEP will enhance the energy conservation capabilities of Egyptian companies through training in Egypt and the U.S. as well as through implementation of technology applications.

2. Project Implementation Start-up

USAID signed the initial Subgrant Agreement (ProAg) with the GOE in September 1988, obligating \$15M for the eight-year project. The ProAg was amended in June 1989, increasing the obligated amount to \$21M.

In February 1989, ECEP funded a one-year, \$891,000 buy-in to an AID/W contract with RCG/Hagler-Bailly (HB) to assist DRTPC, TIMS, and FEI with: the organization of their ECEP Secretariats,

the establishment of project procedures, and the completion of feasibility studies for the first set of technology applications.

In April 1989, AID provided funds to DRTPC, TIMS, and FEI Secretariats after they successfully established procedures and met AID's other requirements. Shortly thereafter, the three Secretariats hired staff and started implementing the project. Initial activities included preparation of informational materials, presentation of the project to various industrial groups, and screening of companies interested in participating in ECEP.

During 1989, AID competitively procured a long-term management/technical assistance (M/TA) contractor. After proposal review (by DRTPC, TIMS and AID), AID negotiated and signed a two-year (extendable to the PACD) \$10.1M M/TA contract with Overseas Bechtel Inc. (OBI). The OBI contract includes a sub-contract with RCG/Hagler-Bailly (HB) which enhances continuity from project design through implementation.

3. Current Status

From a screening of 135 private and public industrial plants, DRTPC and TIMS have identified and completed feasibility studies for 36 technology applications. By September 1991, thirteen companies had signed contracts to implement sub-projects. Under these contracts, the companies pay for detailed engineering work, procurement of locally available equipment, installation of all energy conservation equipment, and monitoring of energy savings (roughly one third of the total sub-project cost). ECEP pays for feasibility studies and the procurement and delivery of the energy conservation equipment imported from the U.S. (roughly two-thirds of the total sub-project cost).

Of the first 13 sub-projects: six are in the private sector (power factor improvement in Seven-up Beverage Co., Giza Cables, and Arab Contractors Medical Center; energy management systems at the Ramsis Hilton and Egyptian International Pharmaceuticals; and cogeneration at ALUMISR) and seven are in the public sector (combustion efficiency in Egyptian Copper Works and Delta Steel; cogeneration at Abu Zaabal Fertilizer; and power factor improvement at National Metals, Shorbagy Textile, and Transport and Engineering Tire Company; and water treatment at SEMADCO

Fertilizer). Energy savings from the first thirteen sub-projects are expected to be about \$800,000/year. By September 1991, installation of the first three sub-projects was complete and a fourth was nearing completion (Ramsis Hilton, Seven-Up, Giza cables, and Arab Contractors Medical Center).

By September 1991, 784 plant and other personnel had already been trained in Egypt on modern energy conservation. An additional 14 have received training in the U.S..

USAID is currently reviewing a request from the GOE to use ECEP funds to implement a large \$10-\$12M cogeneration project.

B. EVALUATION QUESTIONS AND ISSUES

1. ECEP Sub-project Process

- What can be done to improve or accelerate the sub-project process (screening, letter of intent, feasibility study, development of specifications for equipment, implementation contract, Request for Quotations (RFPs), shipping, detailed engineering, installation, monitoring)? Why has it taken so long to launch the first set of sub-projects?
- What are the options for undertaking the detailed engineering required for each sub-project? What is the best option? Who should do the detailed engineering work? Who should pay for the detailed engineering work?
- Do participating companies clearly understand their sub-project responsibilities (engineering, local procurement, installation, monitoring, and maintenance)? Are the companies qualified to fulfill these responsibilities? Do implementation contracts have sufficient detail?
- What can be done to improve or accelerate the procurement process?
- Is there an appropriate mix of technologies in the first 13 sub-projects? Which technologies have the greatest potential for widespread replication?

- How can the project better encourage companies to implement low-cost, no-cost energy conservation opportunities?
- How can ECEP have a stronger impact on GOE energy policy?
- Is the existing organizational structure the most appropriate to meet the overall objectives of ECEP?
- Given that 135 factories have been screened and only 13 have signed implementation contracts, are sub-project selection criteria appropriate? Should ECEP seek larger sub-projects in the \$5-\$15M?
- What are the major problems of sub-project process as viewed by TIMS? DRTPC? FEI? client companies? Bechtel? USAID? energy conservation equipment vendors?

2. USAID

- Is USAID effectively fulfilling its ECEP monitoring and accountability responsibilities? Has USAID effectively communicated its requirements to the TIMS, DRTPC and FEI Secretariats and OBI? Does HRDC/S&T have sufficient staff levels and skills to fulfill their project monitoring requirement? What improvements should be made?
- What changes can USAID make to improve implementation of ECEP?
- Given project progress to date and USAID/Cairo's overall priorities, should the authorized level of \$36M be adjusted? Should the AID obligated amount of \$21M be increa

commodity, and financial control systems adequate to meet GOE and USAID monitoring requirements?

- Are the Secretariats effectively and efficiently implementing the sub-project process (screening, pre-feasibility study, etc.)? Is coordination among DRTPC, TIMS and FEI effective and efficient?
 - Are the Secretariats sufficiently housed, equipped, funded, and staffed to achieve their objectives? Are they allocating staff to the highest priority ECEP activities?
 - Have effective linkages been developed with public and private companies, with Egyptian suppliers, with Egyptian consulting engineers, with other related development projects? Are these linkages a distraction or a direct contribution to achievement of ECEP objectives?
 - Is the Steering Committee providing effective guidance and leadership to TIMS? Have the RCG/Hagler Bailly and OBI contracts contributed effective technical assistance?
 - To what extent is the achievement of ECEP project objectives being facilitated by the existing project organizational and administrative procedures?
 - What steps should be taken to improve the overall functioning of the Secretariats?
4. Overseas Bechtel Inc. (OBI)
- What are the strong points and weak points of OBI's performance under the contract?
 - Is OBI effectively and efficiently procuring ECEP's commodities and training?
 - Is the OBI contract adequately focused on ECEP's objectives and goals? What can be done to improve the contract?
 - Are the responsibilities, relationships and communications among OBI's project staff in Cairo, OBI in San Francisco,

and Hagler-Bailly in Washington appropriate? What can be done to improve the situation?

- Is the role of OBI (technical assistance & procurement) clearly understood by USAID and the secretariats?
- Is OBI providing effective technical assistance to ECEP agencies (TIMS, DRTPC and FEI)? What overall improvements should be made?

5. Overall

- Is the project on a track leading to achievement of its goal and purpose? What changes are needed?
- How will the positive aspects of the project be sustained when AID's assistance ends in 1996? What changes are needed now to enhance sustainability?
- How is the project contributing to the Administrator's initiatives, USAID's strategic objectives and GOE S&T priorities? What can be done to enhance the contribution?
- What policy or program changes could the GOE or AID make to facilitate accomplishment of project goal and purpose?
- Should ECEP undertake a large \$10-12M cogeneration project?
- What is the current and potential future impact of ECEP on Egyptian natural resources and the environment? What changes are needed to enhance this impact?

VI. ENERGY MANPOWER DEVELOPMENT (EMD) PROJECT 263-0140.4

A. PROJECT DESCRIPTION

1. Project Overview

The purpose of the EMD Project is to improve the technical and managerial capabilities of the petroleum and electricity sectors.

The Project consists of systematic manpower planning, defining the most effective training programs available, training, building institutional capacity, and demonstrating the effectiveness of manpower planning and development systems in pilot companies.

The Project's two interrelated components operate in parallel. The first component; capacity building, addresses an immediate need to improve technical and management skills in the petroleum and electricity industries based on manpower development plans. The output will be better trained professionals who will improve job performance and increase production. The component consists of three elements: 1) focused management and technical training programs; 2) training of trainers; and 3) improving training facilities.

The second component will introduce manpower planning and development systems at the three GOE implementing agencies; the Egyptian General Petroleum Corporation (EGPC), the Egyptian Electricity Authority (EEA), and the Electricity Distribution Authority (EDA). The component will adapt, design, and use human resource and career development systems for manpower planning. Services will include assistance in: preparing methods for and conducting annual training needs assessments; refining and updating training plans; designing and installing a manpower development and training database. Manpower development systems will be applied and tested, on a pilot basis, in three companies: the General Petroleum Company, the Cairo Petroleum Refinery, and the Alexandria Zone of EEA.

2. Project Implementation Start-up

USAID signed the initial EMD Project Agreement (ProAg) with the GOE in September 1988 obligating \$5M for the six-year project. The ProAg was amended in July 1990, increasing the obligated amount to \$8.6M, the total authorized AID level of funding.

In May 1989, AID awarded a \$960,000 interim buy-in contract to the International Institute for Education (IIE) to assist EGPC, EEA and EDA by preparing manpower development master plans and by presenting training courses in Egypt. IIE arranged U.S. training for thirteen participants, trained an additional thirteen Egyptian trainers, and conducted five training courses in Cairo.

During early 1990, AID competitively procured a long-term Management/Technical Assistance (M/TA) contractor. In June 1990, AID negotiated and signed a two-year (extendable to the PACD) \$4.12M contract with International Human Resources Development Corp. (IHRDC), with Stone and Webster as a sub-contractor.

3. Current Status

During FY91, EMD was presenting courses every month, except during summer and the Gulf war period. The three GOE implementing agencies approved plans for U.S. training which included: study tours, training of trainers, industrial training, and industrial internships. U.S. training under the IHRDC contract is scheduled to start in October 1991. USAID agreed to a request from the GOE implementing agencies to eliminate U.S. academic training and reprogram the funds for additional industrial training and industrial internships.

Limited progress has been made on the establishment of manpower development systems at the three pilot companies. IHRDC has been preoccupied with selling EMD its proprietary manpower planning software and started installing it in the three companies. Much of FY91 was spent discussing software issues. When the software finally arrived, on a trial basis, in August 1991, it was full of bugs.

In February 1991, AID and the Ministry of Electricity and Energy (MOEE) agreed to use EMD project funds for a new MOEE Executive Management Training Program. In July, IHRDC consultants starting working with the newly established MOEE steering committee and MOEE senior management to develop an Action Plan for the Executive Management Training Program.

By August 1991, the EMD project had trained 320 people in sixteen training courses in Egypt:

Petroleum Sector

- "International Petroleum Pricing and Agreements"
- "Petroleum Accounting, Finance and Economics"
- "Project Management, Appraisal and Evaluation"
- "Petroleum Economics"
- "Management I"

- "Learning Systems Design"
- "Reservoir Engineering"
- "Spare Parts"
- "Management II"

Electricity Sector

- "Utility Management"
- "Power Plant Operations, Maintenance & Utility Management"
- "Personal Skills for Managing People"
- "Performance Evaluation"
- "Engineering Economics"
- "Standard Specifications"
- "Improving Distribution Operations and Service Quality"

B. EVALUATION QUESTIONS AND ISSUES

1. EMD Project Process

- Are project administrative, commodity, and financial control procedures effective and efficient? Do they meet all GOE and AID requirements? What improvements can be recommended?
- Is senior management of the three GOE agencies committed to the project? Are the agencies allocating sufficient staff resources to ensure the success of the project?
- To what extent is the achievement of project objectives being facilitated by the existing project organizational and administrative procedures, including participation of other organizations?
- What steps should be taken to improve the overall functioning of the project?

2. Training Courses in Egypt

- Do the courses being presented meet the most critical training needs of the GOE agencies? What steps should be taken to ensure that the courses optimally address training needs? What new courses should be offered?

- What is the impact of the training? Are course participants learning skills that will improve the effectiveness and efficiency of their agencies?
 - Has the project selected the appropriate Egyptians to train as trainers? Are the trainers learning the appropriate skills in the training of trainers program? Will the Egyptian trainers being trained by the project be able to teach the courses on their own?
 - Are the training programs sustainable? Will the agencies continue to provide needed training after completion of the EMD Project?
 - What are the major advantages and disadvantages of the training programs? What can be done to improve the programs?
3. Training in the U.S.
- Are the most appropriate candidates being selected for U.S. training? What can be done to improve the selection process?
 - Do the U.S. training programs meet the real needs of the EMD project? What can be done to enhance the contribution of the U.S. training to meeting EMD objectives?
 - What is the impact of the training? How will the GOE agencies benefit from the training? Will the participants be able to spread what they learned in the U.S. to their agency colleagues?
 - What are the major difficulties or obstacles to the success of the U.S. training? How can these be reduced or eliminated?
4. Electricity Executive Management Training (EMT) Program
- Does the EMT contribute to the objectives of EMD project?
 - Is the EMT Action Plan appropriate for the needs of MOEE? Can the Action Plan be successfully implemented? What

problems or issues may arise in implementing the Action Plan?

- Is the EMT consistent with management practice in MOEE? What impact will the EMT have on management within the MOEE?
- Will the MOEE be able to provide the appropriate personnel needed to establish and operate a successful EMT Program?
- Will the EMT Program be sustainable after completion of the EMD Project in 1994?

5. IHRDC

- What are the strong points and weak points of IHRDC's performance under their contract? Is the contract adequately focused on EMD objectives and goals? What can be done to improve the contract?
- Is IHRDC effectively and efficiently procuring commodities (including software), training, and consultants? What improvements can be suggested?
- Are there appropriate relationships and communications among the IHRDC/EMD, IHRDC/Cairo, IHRDC/Houston, and IHRDC/Boston offices? Is the balance of responsibilities and resources among the four offices appropriate? What can be done to improve the situation?
- Is IHRDC providing effective assistance to EMD? What overall improvements should be made?

6. USAID

- Is USAID effectively fulfilling its EMD monitoring and accountability responsibilities? Has USAID effectively communicated its requirements to the GOE implementing agencies, the pilot companies, and IHRDC? What improvements should be made?
- Has USAID provided effective guidance to the EMD project? Does HRDC/S&T have sufficient staff levels and skills to meet its project responsibilities?

- What changes can USAID make to improve implementation of EMD?
7. Overall
- Is the project on a track leading to achievement of its goal and purpose? What changes are needed?
 - How will the positive aspects of the project be sustained when AID's assistance ends in 1994? What changes are needed now to enhance sustainability?
 - How is the project contributing to the Administrator's initiatives, USAID's strategic objectives and GOE S&T priorities? What can be done to enhance the contribution?
 - What policy or program changes could the GOE or AID make to facilitate accomplishment of project goal and purpose?

VII. EVALUATION REQUIREMENTS

A. METHODOLOGY

1. Review relevant background documents including, but not limited to: Project Papers, Project Agreements, Contracts, Subcontracts, Sub-grant Agreements, RFPs and other procurement documents, Project Implementation Letters, Project Procedures and Manuals, Project Status Reports and Reviews, Newsletters and Promotional Materials, Feasibility Studies, Consultant Reports, Trip Reports, and selected correspondence.
2. Interview in person (or by phone if necessary) key individuals involved in design, start-up, implementation, and monitoring of the STD umbrella project and its four components including, but not limited to:
 - Senior and operational counterparts in all GOE implementing agencies and Secretariats.
 - Key individuals in USAID/Cairo and AID/Washington.

- Project participants including:
 - Principal Investigators
 - Technical Review Panel Members
 - Steering Committee Members
 - Principle Investigators in STC and SRP
 - Companies Participating in ECEP and STC
 - Participant and in-country trainees
 - Contractor/Consultant/PASA personnel in field and home offices including:
 - Medical Service Corporation International (MSCI)
 - RCG/Hagler Bailly (HB)
 - Institute of International Education (IIE)
 - International Development & Energy Associates (IDEA)
 - Overseas Bechtel Inc. (OBI)
 - International Human Resources Development Corporation (IHRDC)
 - NAMRU-3
 - Design Consultants: MSCI, HB, IIE, Clinton Stone, James Blackledge, Clive Shiff
3. Visit selected project sites such as factories of STC and ECEP end-users, laboratories of Principal Investigators, EMDP pilot companies.
 4. Using the evaluation issues and questions stated herein as a guide, compile and analyze relevant information and use professional judgment to draw conclusions and specify recommendations.
 5. Prepare oral and written reports of finds, conclusions, and recommendations.

B. REPORTING REQUIREMENTS

Each of the five evaluation report shall include, but not be limited to, the following sections:

Contents:

- Executive Summary
- Summary of Findings, Conclusions, Recommendations and Lessons Learned
- Main Body (details which support findings, conclusions and recommendations)

Annexes:

- List of Individuals Interviewed
- Bibliography of Documents Reviewed
- Scope of Work: Evaluation Issues and Questions
- Methodology and Team Composition
- List of Acronyms
- Others, as appropriate

The First Draft of each report shall be submitted to AID (4 copies) and to the GOE agencies (4 copies) one week prior to contractor's departure from Egypt. The evaluation team shall make an oral presentation of findings, conclusions and recommendations at AID four days before departure from Egypt. Final Evaluation Report shall be submitted to AID (15 copies) and to the GOE agencies (5 copies) prior to the team's departure from Egypt.

C. CONTRACT DURATION AND SCHEDULING

From start to final report, each of the five evaluation reports should take no more than six weeks (five weeks in Egypt and one week in the U.S. or in transit). USAID assumes that the five separate evaluation reports will be developed, more or less, simultaneously. The total evaluation effort under the contract should be completed during the second quarter of FY 1992 (January - March 1992).

D. OVERALL TEAM COMPOSITION

1. Skill Areas

USAID assumes that, in general, U.S. experts employed by the contractor will have more than one area of expertise. Furthermore,

USAID assumes that certain team members will have skills useful to all evaluation reports; for example, experience with AID's procurement of commodities, technical assistance and training; or experience with the design, implementation and evaluation of AID projects. The contractor shall budget for up to a total of 55 person weeks of U.S. experts and 20 person weeks of Egyptian experts (inclusive of the Chief-of-Party and Team Leaders for the five evaluation reports). Listed below are the skill areas that will be needed to complete the evaluation:

- Senior management of development projects with responsibility for review/approval of project designs and oversight of project implementation.
- Experience with AID regulations concerning procurement of technical assistance, commodities, and training.
- Design & implementation of USAID field projects involving research grant programs, technology transfer, administration of science and technology, and manpower/institutional development.
- Experience with conducting evaluations of AID field projects; ability to rapidly compile and analyze information from diverse sources and to produce quality reports within tight deadlines.
- Experience with S&T development strategies and the roles of S&T in third world economic development.
- Experience with S&T development strategic issues involving energy efficiency, industrial production, and manpower/institutional development. industrial minerals and chemicals, water and wastewater treatment, biotechnology, small scale industries, and industrial computer applications.
- Experience with S&T activities and issues affecting productive sectors in Egypt.

- Experience with Schistosomiasis research issues involving vaccine development; improved diagnostic methods; better chemo-therapeutic regimens; epidemiology of schistosomiasis; socio-economic factors that affect the disease; and, operations research to develop systems for delivering appropriate interventions.
- Experience with health research issues in Egypt.
- Experience with energy conservation technologies and issues such as cogeneration, power factor improvements, waste heat recovery, energy management systems, and combustion control.
- Experience with energy issues and technologies affecting industries in Egypt.
- Experience with management and human resource issues of energy agencies in developing countries; such as Egypt.

2. Nationality of Team Members

The evaluation team will compose of U.S./International experts and Egyptian experts.

The contractor shall hire an Egyptian national to work on the evaluations of each of the four components. Thus, the contractor is expected to hire four Egyptian experts: application of research for the solution of industrial problems, schistosomiasis research, industrial energy conservation, and human resource development in energy agencies. If requested, USAID and GOE counterparts will identify suitable Egyptian candidates for these four positions.

3. Example of Possible Team Composition

Given the diversity of activities to be evaluated and the range of skills required, there are a multitude of possible combinations of experts who could successfully complete the evaluation. Provided below is just one example of a possible mix of 15 team members and their potential input to the five evaluation reports.

Area of Expertise	Evaluation Report				
	STD	STC	SRP	ECEP	EMDP
1. Chief-of-Party	X	X	X	X	X
2. AID Procurement Expert	X	X	X	X	X
3. Training Expert (USA & In-country)			X	X	X
4. Project Implementation Expert	X	X	X	X	X
5. Team Leader - Technology Transfer to Productive Sectors		X			
6. Team Leader - Schistosomiasis Research			X		
7. Team Leader - Industrial Energy				X	
8. Team Leader - Developing Human Resources in Energy Agencies					X
9. S&T Strategy/Evaluation Expert	X	X	X	X	X
10. Schistosomiasis Expert			X		
11. U.S. Admin Assistant - Logistics/ Report Preparation Specialist	X	X	X	X	X
12. Egyptian Industrial S&T Expert		X			
13. Egyptian Schistosomiasis Expert			X		
14. Egyptian Industrial Energy Expert				X	
15. Egyptian Energy Agency Management Expert					X
Number of Experts Contributing in Each Evaluation Report	5	7	9	8	8

E. BUDGETING INFORMATION

The contractor shall budget \$10,000 local (non per diem) expenses in Egypt including: office rental, secretarial services, local transportation & car rental, duplication, telephone/fax, messenger services, etc.. Furthermore, the contractor shall budget up to \$20,000 to hire four Egyptian experts in subject areas of the four components.

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