

PD-AAN-778

263-0016/53

April 15, 1983

APPLIED SCIENCE AND TECHNOLOGY RESEARCH IN Egypt

Quarterly Report Number 6: Phase II

January - March 1983

Contract Number NEB-0016-C-00-1058-00

Project Number 263-0016

Report prepared by

Board on Science and Technology for International Development
Office of International Affairs
National Research Council
Washington, D.C.

March 1983

INTRODUCTION

This is the sixth quarterly report, Phase II, of the Applied Science and Technology Research Program in Egypt and covers the period January - March 1983. The program is under Contract NEB-0016-C-00-1058-00 of the United States Agency for International Development (AID) with the National Academy of Sciences/National Research Council (NAS/NRC).

For a background description of all elements of the Applied Science and Technology Research Program during Phase I (1978-1981), see the report prepared by the NAS/NRC staff dated June 1982.

Contents

	<u>Page</u>
MAJOR ACTIVITIES	
I. Policy Planning and Management	1
A. R&D Management Project	1
B. Science and Technology Policy Measures Project	4
II. Demonstration Projects	7
A. More and Better Food (including Food Technology Pilot Plant Feasibility Study)	7
B. Biogas Technology in Rural Areas of Egypt	9
C. New Crops for Arid and Semi-Arid Zones	10
III. Research and Development Projects	12
A. Evaluation of Egyptian Phosphate Ores	12
B. Corrosion Causes and Control	13
C. Improving Wool Scouring and Wool Wax Recovery	14
D. Development of Red Sea Fisheries	15
E. Preparation of Selected Pharmaceutical Chemicals	15
F. Egyptian Bentonites for Industrial Applications	17
DISCUSSION OF PROGRESS AND PROBLEMS ENCOUNTERED	19
ANNEX A: Planning Organizing and Controlling of R&D Projects	24
ANNEX B: Chart of R&D Management Activities	27
ANNEX C: Travel from Egypt January 1 - March 31, 1983	28
ANNEX D: Travel to Egypt January 1 - March 31, 1983	29

111

APPLIED SCIENCE AND TECHNOLOGY RESEARCH IN EGYPT

Sixth Quarterly Report : Phase II

January - March 1983

MAJOR ACTIVITIES

I. Policy Planning and Management

A. R&D Management Project

During the period from 15 February to 1 March 1983, two simultaneous workshops on the topic "Planning, Organization and Controlling Research and Development Projects" were presented at the National Research Centre (NRC/Cairo) with 80 staff scientists and engineers participating. The workshop leaders were Dr. A. S. El-Nockrashy, General Coordinator for the Applied Science and Technology Research Program of ASRT; Dr. A. A. Abdel Azim, Director, Central Metallurgical Research and Development Institute, NRC/Cairo; Dr. M. M. El-Halwagi, Principal Investigator, Biogas Technology Demonstration Project and Head, Pilot Plant Division, NRC/Cairo ; Dr. M. El-Hosany Abdel Salam, Researcher, More and Better Food Demonstration Project and Professor of Food Technology Demonstration and Dairy Science, NRC/Cairo ; and Dr. Osman Galal, Principal Investigator More and Better Food Demonstration Project and Director, Nutrition Institute, Ministry of Health. An outline for the workshop presentations is given in Annex A.

The workshop was repeated at the Academy of Scientific Research and Technology (ASRT) during the period March 26-April 2, 1983 for a group of 20 participants from the ASRT staff (Specialized Research Councils, Vice Presidents' Office, Technical and Statistical Department, etc.) plus 16 from ASRT Affiliated Institutes (National Standards Institute, Petroleum Research Institute, etc) and 3 from the Nutrition Institute, Ministry of Health (Total participants 39)

These activities represent a significant step toward the institutionalization of the R&D management training function at the level of principal investigator and scientific researchers. That capability within ASRT and NRC/Cairo is a goal of the Applied Science and Technology Research Program.

A second activity which occurred during the January-March 1983 quarter was the visit of the consultant Mr. James Blackledge for a two week period to assist in formulating an action plan and schedule for additional inputs into the R&D Management Program. (See also Quarterly Report III, April-June 1982).

Working with Drs. A.S. El-Nockrashy, Osman Galal, and Leo Packer (NAS Resident Program Representative), Mr. Blackledge utilized an Action Plan prepared by Dr. El-Nockrashy in recommending an ambitious schedule of activities with international inputs from NAS/NRC under

the contract. These are to include : (a) seminars at the level of R&D Laboratory (Program) managers, and senior executive seminars; (b) selective training opportunities for key Egyptian R&D executives in the U.S.A. ; (c) management internships for Egyptians in U.S. R&D laboratories or institutes ; (d) institutionalization of marketing, technical economic analysis, contracting/procurement and **other functions in the NRC; (e) specialized activities to strengthen ASRT management and control functions particularly with respect to the new 5 year program of S&T ; (f) preparation of case studies ; and other activities.** A chart of the R&D Management Program activities may be found as Annex B.

An Egyptian steering committee for the R&D Management Project has been appointed. It consists of the following persons :

- Dr. Mohamed Kamel, Director, NRC/Cairo
- Dr. M.B.E. Fayez, Vice President, ASRT
- Dr. Abou El-Fetouh Abdel Latif, Vice President, ASRT
- Dr. Osman Galal, Director, Nutrition Institute (Ministry of Health) and Head, Child Health Division, NRC/Cairo
- Dr. A.S. El-Nockrashy, Program Director for International Cooperation, ASRT
- Dr. M. Hilal, Head, Technical Office of the President, ASRT
- Dr. Nabil Saleh, Executive Secretary, NRC/Cairo R&D Management Executive Advisory Committee.

The NAS is expected to appoint a 3 person management advisory panel to work with the Egyptian steering committee in policy planning and implementation of the program.

B. Science and Technology Policy Measures Project.

During the quarter the S&T Policy Measures Project formed two high level working groups to prepare for Seminar III in November 1983. One group is directly under the chairmanship of Dr. Ibrahim Badran, ASRT President. The second is under Dr. I.Helmi Abdel Rahman, JCC member and Counselor, Office of the Prime Minister.

The working group under Dr. Badran has set as its goal the identification of options that could be the basis for a technology policy outline for Egypt. This group, using a "strategic" or "policy formulation" approach (a vertical approach across productive sectors,) has as its Executive Director, Dr. Essam E. Galal, a medical doctor and educator. There are six sub groups concerned with :

- Technology selection, that is, identification of criteria for technology choices appropriate to Egyptian development at sectoral and institutional levels
- Measures for encouraging and strengthening indigenous generation of technologies

- Implementing technology transfer through positive choice selection procedures, and incentives

- Institutional framework to regulate technology transfers
- International and regional cooperation
- Legal instruments of technology policy.

The second working group has as its executive director Dr. M. Shahat Awad and will examine the technology policy implications in the 5 year Egyptian national plan for social and economic development (1983-1987). It has a "sectoral" (sometimes called "inter-active" or "horizontal") approach for identifying and promoting technology for development in :

- Agriculture
- Industry
- Construction
- Energy

Meetings have been convened with the Minister of Agriculture, the directors of institutes and major departments of the Agricultural Research Centre, and ASRT representatives to examine the goals of the 5 year plan with respect to increased agricultural productivity and the relevant technology.

Similar meetings with the Minister of Industry, the General Organization for Industrialization (GOFI, which is the development branch of the Ministry) and representatives of the ASRT Specialized Council for Industry are scheduled to review such questions as :

- Structure and management of Egyptian centers where industrial research occurs,
- Needs for new R&D units in large industrial companies, and
- A proposed plan for sectoral or other core industrial R&D institutes.

In the future the activities of the interactive approach group will be extended to the construction and energy sectors of the Egyptian economy.

II. Demonstration Projects

A. More and Better Food

1. Village Studies

A decision has been reached by the Steering Committee to extend the field activities of the project to two additional villages :

● Beni Zaid/El Akrad, Assuit Governorate, which is close to the City of Assuit has been chosen as one of the villages. Prof. Shafik S. Hassan from Assuit University has been engaged to gather base line data (as was done in the villages of Kafr El Khadra and Omar Makram before field activities were undertaken.) Background data which are to be assembled before July 1983 include :

1. Current social, economic, and demographic statistics
2. Enumeration of major crops produced and measures of productivity in terms of unit outputs/feddan
3. Description of agricultural practices (rotation patterns, irrigation patterns, fertilizers and pesticides used and their quantities, markets served, etc.)
4. Surveys of what new crops or improvements the farmers wish to introduce and the inputs needed (seeds, agricultural chemicals, fertilizers, credits, agricultural machinery, etc.)
5. Assessment of the impact of extension services on the basis of acreage enrolled, number of farmers participating, incentives offered, etc.
6. Mapping the structure of village leadership, perceived openness to new agricultural techniques, etc.

Based upon the above data and its analysis, the More and Better Food Steering Committee will propose a plan of action for village demonstration activities.

- The village of Beni Magdol is in Giza Governorate. The More and Better Food group at NRC will work through an already established extension service of the Ministry of Agriculture to achieve productivity improvements in plant production (wheat, peanuts, citrus and vegetables), animal husbandry (chicken, cattle and rabbits), and dairy production (cattle and goats). A nutritional foods element is also under study.

2. The Food Technology Pilot Plant.

One half the needed funds for construction of the Food Technology Pilot Plant, or LE 150,000 has been pledged by the ASRT from its current budget. The remaining LE 150,000 is being sought from the 1983-84 budget (The fiscal year begins July 1, 1983 in Egypt). If the funds for 83-84 are approved as expected during May 1983, NRC/Cairo can immediately request bids for the construction of the building. USAID allocation of funds for equipment and training would then be formally requested by ASRT. That approval would be expected within 30-60 days because funds are available within Project 263-0016 for the food technology pilot plant activity.

B. Biogas Technology

A 50 cubic meter biodigester unit was designed by NRC/Cairo for a poultry production project at Shubra Kass, a village of about 10 to 12 thousand inhabitants in Garbeya Governorate near Tanta, at the request of VITA (Volunteers in **Technical Assistance**, a U.S.A. based development assistance group.) Construction was essentially completed by March 1983 and preliminary testing of the system begun prior to the trial runs, using chicken manure as feed stock for the biodigester. This experiment is one of particular interest because it represents a larger model than those in the NRC/Cairo demonstration project villages of Al Manawat and Omar Makram. Furthermore, the project is under the supervision of NRC/Cairo with actual construction and eventual operation by the VITA sponsoring group. This activity not only tests the extension service concept but also represents a "second generation" design by the NRC biogas technology team.

The biogas technology testing laboratories at NRC are essentially complete, although phase II equipment and instrumentation have not yet arrived. All basic analytical instrumentation is in place and operating, with Phase II equipment representing greater data gathering/processing capabilities and additional field equipment items. The laboratory and demonstration biogas digester facility at NRC/Cairo is

being moved to another part of the land area comprising the Centre. (The move is required because of reallocation of lands to accommodate the proposed new food technology pilot plant.) Start up of the model facility for training and other purposes has therefore been moved back until late 1983.

The principal investigator, Dr. M.M. El-Halwagi visited the U.S.A. between 20 January and 20 February 1983 to :

- Participate in the 7th Symposium on Energy from Biomass and Wastes sponsored by the Institute of Gas Technology, in Florida
- Review recent technical and economic advances in biogas technology at the Universities of California at Los Angeles and Berkeley and at the Greater Chicago Metropolitan Sanitary District, and
- Participate with the U.S. panel members in a review of the technical/social/economic aspects of the program at Cornell University, Ithaca, New York.

C. New Crops for Arid and Semi Arid Zones

Planning for the re-orientation of the Arid Zones Demonstration Project continued in Cairo ; a report is expected to be given at JCC-XI in May 1983.

The JCC at its tenth meeting in Cairo (November 1983) endorsed a project to evaluate technologies used in reclamation and development of desert lands in Egypt over the past 20-30 years. The goal of the study would be to examine successes and failures in light of the emphasis upon land reclamation and resettlement in the Egyptian national development plan. Important parameters of the study would be :

- Comparison of different irrigation systems (conventional, trickle, sprinkle, etc) to learn about water use efficiencies, energy costs, labor costs, crop yields, soil utilization, and differing land tenure systems.

- Comparison of mechanization practices in reclamation and cultivation of new lands recognizing different soils, cropping systems, management and land tenure experience.

Planning for the proposed reclamation experience study is under the Agricultural and Food Council of the ASRT with the cooperation of the Ministry of Land Reclamation.

III. Research and Development (R&D) Projects

A. Evaluation of Egyptian Phosphate Ores

Figure 1. below gives a synopsis of the project as of March 1983

<u>Ore type</u>	Ore Evaluation	<u>Figure 1</u> Ore Beneficiation		<u>Ore</u> <u>Calcination</u>	Chem Proc. to Acid	
		<u>Lab.</u>	<u>Pilot Plant</u>		<u>Batch</u>	<u>Lab</u>
1. Western Desert (Abu Tartur)	Complete	Complete	Complete	N/A	Complete	NO
2. Nile Valley (Sebaiya)	Complete	Complete	Complete	Complete	Complete	NO
3. Red Sea (Hamrawein)	Complete	Complete	Complete	Complete	Complete	No

Note : N/A = not applicable

From the above information one can readily see that the major uncompleted step is the laboratory scale, wet chemical processing conversion of the 3 ore types. The laboratory scale unit for NRC/ Cairo (wet chemical processing to phosphoric acid) is a custom designed, but nevertheless bench scale, set of apparatus modeled after that which is in use at the International Fertilizer Development Center (Muscle Shoals, Alabama, USA). Although greater than two thirds of the equipment components have been received in Cairo, five key elements continue to be listed as "not ordered" as of January 1983 by the Phase I procurement contractor (Afro American Purchasing Company). Follow-up inquiries continue to be made by USAID in Cairo in the expectation that delivery can be expedited by early summer.

Some Batch scale conversions of beneficiated ore samples to fertilizer end-products have been made on materials from each of the regions where phosphate ores were sampled and investigated (Western desert, Red Sea and Nile Valley). Quantities have not been sufficient for field testing, definitive flow sheet characterization, and techno-economic evaluation. These steps, together with the utilization of the wet processing laboratory unit, are the principal steps remaining prior to completion of the R&D project.

B. Corrosion Causes and Control

The principal elements of the Corrosion R&D project are (a) corrosion monitoring in the Suez Oil Refinery, (b) preparation and testing of corrosion inhibitors, (c) laboratory studies of corrosion behavior in Egyptian reinforcing steels and metals, (d) laboratory studies of alloys in sulphide-containing solutions, and (e) strengthening the NRC/Cairo corrosion laboratory to serve applied R&D needs in Egypt.

During December 1982, the desalter in the Suez refinery which was the principal source of corrosion for the entire manufacturing plant was repaired. Subsequently portable monitoring equipment (purchased during Phase I) was put into testing operation. Data are now being collected and analyzed.

A promising corrosion inhibitor for steel in hydrochloric acid environments has been prepared from naturally occurring products. The formulation has been given the name "Extrine" and tested in the cleaning of power station boilers. Preliminary indications for this application are that "Extrine" is as effective as more expensive imported corrosion inhibitors.

Testing of the corrosion behavior of Egyptian reinforcing steels and of sulphide corrosion of stainless steels continues.

The ESCA instrument (Electron Spectroscopy for Chemical Analysis) is in use with good results as a fundamental research tool. In the late summer, a U.S. consultant is expected to assist the NRC/Cairo group in utilization of the instrument to several applied R&D problems.

C. Improving Wool Scouring and Wool Wax Recovery

The long awaited delivery and installation of the new wool scouring/ wool wax recovery equipment was completed at the Misr Beida Dyers textile plant near Alexandria.

Initial start-up of the line began with immediate results noted in:

- Reducing acid concentrations in wastes from the washing process,
- Reducing the quantities of chemicals required because of recycling within the new "closed system,"

- Improvement in the quality and quantity of wool wax recovered, and
- Greatly reducing the volume of solid wastes for ultimate disposal.

As of March 1983, however, the new scouring/wax recovery system had not been operated on a continuous (24 hour) basis. Thus, optimum results have not yet been attained within the closed system. NRC/Cairo and Beida Dyers scientists and engineers are continuing to monitor the various steps in the process to balance the system. Skilled operators and technicians are being trained for shifts 2 and 3 prior to continuous operation which is scheduled to begin during the summer months.

D. Development of Red Sea Fisheries.

The project, now under the direction of Dr. Aboul-Fetouh Abdel Latif, ASRT Vice President and former director of the Institute of Oceanography and Fisheries, has assembled its research team and contracted for a vessel from the Red Sea Governorate. Field and laboratory activities have now been scheduled according to the information given in Figure 2.

E. Preparation of Selected Pharmaceutical Chemicals.

Four of the list of thirteen chemical compounds selected for the project have been prepared at bench scale in the laboratory. They are:

<u>Chemical</u>	<u>Use</u>
● Acetazolamide	diuretic, glaucoma treatment
● Isonazid	anti-tubercular agent
● Naphazoline	nasal decongestant
● Mebendazole	anthelmentic

Figure 2

<u>Activity</u>	1983 Quarters				1984 Quarters			
	1	2	3	4	1	2	3	4
1. Pelagic fisheries								
Planning	x							
Field sampling		x	x	x		x	x	
Exploratory fishing		x	x	x		x	x	
2. Shrimp								
Deep trawling								
Planning	x							
Field sampling				x		x	x	
3. Lobster studies								
Planning	x							
Field sampling		x	x	x		x		
4. Reef fish								
Planning	x							
Field sampling			x	x				x
5. Base line data								
Chem/physical/biological oceanography		x	x	x	x	x	x	
6. Socio-economic study of fishermen and villages		x						
7. Preparation of final report								x

According to the above schedule all field work should be completed by mid 1984 with the technical report writing, market analyses, and project reports finished later in 1984.

Another has been dropped from further consideration (furosemide, a diuretic) for technical reasons.

Continuing its coordination role, the project steering committee has recommended quality and assurance standards which must be met for the pharmaceutical chemicals which are to be produced, arranged for collaboration of industry scientists/engineers in techno-economic studies and in scale-up for pilot plant work, and assisted in formulating a "license-fee protocol" for use by the industry and NRC/Cairo at the time of commercial production arising from the R&D project.

The experimental group received on an expedited basis seventeen chemicals secured by NAS/NRC (materials purchased as a one-time input in quantities of one kilogram each). In addition, one of the Egyptian industry groups represented on the Steering Committee, the Arab Company for Drug Industries and Medical Appliances (ACDIMA), made a special arrangement to secure 4 to 10 kilogram quantities of sixteen chemicals for air delivery to NRC/Cairo. Chemicals in larger quantities (up to 100 kg) are being purchased from the equipment budget with the assistance of the contractor, the University of Wisconsin.

F. Egyptian Bentonites for Industrial Applications.

The U.S. project advisor, Dr. Hayden H. Murray, Chairman, Department of Geology, Indiana University, visited the bentonite group in Egypt, February 3-11, 1983, to review technical progress and assist in planning. With the project geologists, Dr. Abdel Kader Attia and Dr. Sabbah M. Boulos, a visit was made to two field sites near Cairo where bentonite clays occur. The major deposit in the Fayoum previously investigated, has considerable

gypsum as an impurity which must be removed if the material is to be activated successfully. There are at least three other known bentonite clay deposits in Egypt which remain to be evaluated. This is very important because:

- No single bentonite deposit is suitable for all needs and uses. (Physical and chemical properties of the clays plus impurities always affect the end use.)
- Bentonites are bulk quantity materials; thus beneficiation costs and transport of the finished material are critical to economic utilization.

During the April-June 1983 period Mr. Albert Rich, a chemical engineer and consultant for acid activation of bentonites, is scheduled to visit the Egyptian group and teach a short course. He will also consult on the bentonite applications to bleaching of edible oils. Mr. Donald Weintritt, also a chemical engineering consultant, will visit Egypt to assist with bentonite applications for drilling fluids (petroleum exploration) and for foundry binding materials. Mr. Weintritt is a private "entrepreneur consultant" in a small firm which he founded principally to serve in the specialized, high technical area of oil well drilling fluids. The formulation of drilling fluids, based upon bentonite clays as the primary ingredient is essential in modern oil well drilling operations. Large quantities of the fluids, known as "drilling muds" are used. Most oil exploration companies formulate their own drilling fluids and jealously guard those formulas as "proprietary information." The NRC project will benefit greatly from the expertise of Mr. Weintritt because alternative options (literature, technical associations, consultation directly with industry) in this specialized subject are almost nonexistent.

DISCUSSION OF PROGRESS AND PROBLEMS ENCOUNTERED

I. Institutionalization

A continuing concern of the Applied Science and Technology Research Program Management has been the "institutionalization" of the program. In this context "institutionalization" means the transfer of know how from an originating group and its local transformation to a truly Egyptian setting. Several positive evidences of the institutionalization process may be cited:

- R&D Management. Local workshops on planning, organizing and control of R&D management have been held at the ASRT and NRC during the January - March 1983 reporting period.
- Biogas Technology. A major facility for energy generation (heat) in poultry production has been designed and built by the biogas group of NRC, utilizing chicken manure as/ feed stock. This project was contracted by the American group VITA (Volunteers in Technical Assistance) directly to the NRC biogas laboratory.
- Phosphate Fertilizers. The El Hamrawein Fertilizer Company (Red Sea) has contracted the services of the phosphate group, NRC, for training of its employees and for assisting in technical process design improvements.

Participation of the co-principal investigator of the phosphate group (Dr. Refaat Boulos) and the General Manager of El Hamrawein (a public sector company) in the 1983 International Fertilizer Industry Association technical conference in the People's Republic of China was financed by the Government of Egypt (Ministry of Foreign Affairs) to promote continuation of phosphate exports to the Chinese market.

- Pharmaceutical Chemicals. The Arab Company for Drug Industries and Medical Appliances (ACDIMA) provided 16 chemical intermediates (in quantities of 4 to 10 kg) for the bench scale and semi-pilot-plant steps for the Pharmaceutical Chemicals R&D Project.

- Wool Scouring/Wool Wax Recovery. Misr Beida Dyers participated in the cost for the equipment ordered from the Alpha Laval Company and is paying all operating costs for the in-plant testing of the new process.

II. Constraints

Several constraints continue to impede efficient and expeditious operation of the project. These include:

- Incentives. Because of the Egyptian salary and reimbursement structure, additional pay (salary topping) for project activities is customary. The Government of Egypt limits the incentive payments plus base pay for government employees in laboratories and institutes, as well as those engaged in public sector firms, to three times base salary when the funds are from a GOE source. Thus the incentives fund from the Ministry of Finance has an inherent "cap" for persons from ASRT and affiliated research institutes. This can in certain cases eliminate the provision of reimbursement for services rendered, or of honoraria for persons who participate as consultants in special studies.

Similarly, the AID mission has a well defined policy not to grant incentive payments to GOE employees except in those special circumstances when an employee is performing a time-limited, clearly differentiated service (usually a commissioned paper). Even these exceptions require review on a case-by-case basis.

In the S&T Policy Measures Project, high level committees are utilized as a group to achieve by discussion and consensus an input "policy statement." At times they assign one or more persons to assist by drafting a position or discussion paper, and then the group critiques the input. For certain key contributors, neither the GOE nor the AID procedure permits reimbursement from incentives fund or the project. This situation is responsible for an impediment in customary and normal incentive payment possibilities. Efforts to resolve the dilemma so far have been unsuccessful.

- Laboratory services. In the case of the pharmaceutical chemicals project, one of the ongoing needs is to use the sophisticated analytical capabilities of the NRC Central Services Laboratory to characterize intermediate stages of the synthesis process. To pay for use of these services a fee must be charged but the project local materials and supplies fund guidelines do not currently allow for this cost. Because general funding for the pharmaceuticals laboratory from other sources is so limited, it is sometimes necessary to wait 4-6 weeks for a routine spectrographic analysis on the basis of non-reimbursed "time availability" in the Central Services Laboratory. A way around this situation is currently being sought.

III. Review of NAS/NRC input and performance, Applied Science and Technology Research Project.

The "parent body" of the Egypt program group in NAS/NRC is the Board on Science and Technology for International Development (BOSTID). BOSTID like the Joint Consultative Committee for the Egypt program, is an advisory board. Currently two members of BOSTID are conducting a review of BOSTID's participation (1977-1983) in the USAID financed Applied Science and Technology

Research Program in Egypt. Other BOSTID programs are also under active review and evaluation.

The principal objective of the Egypt program review is to make an informed judgment on the effectiveness of the NAS/NRC participation in that program. The timing of the review is perhaps propitious because of AID planning for future programs and for decisions for NAS/NRC to participate in future Egypt activities -- if BOSTID is invited to do so. In addition, the experience and methodology of the review will be useful to the JCC and perhaps to AID itself.

Thus, the focus of the review has been largely upon BOSTID's capabilities and performance. Attention has been given to an understanding of how the program originated, was shaped, and has functioned, but the review is not primarily one dealing with technical evaluation of individual elements. It is a management and policy level analysis of the conceptual basis for the Egypt program and the effectiveness of the BOSTID response to this major activity, which has engaged NAS/NRC for more than 6 years.

Since JCC and AID will be responsible independently for the formal program evaluation, the BOSTID activity promises to be one valuable input to that end-of-program requirement.

BOSTID members who conducted background discussions for the program were:

o Mr. W. A. W. Krebs, Vice President, Arthur D. Little, Inc., Cambridge, Massachusetts. (Mr. Krebs is familiar with evaluation methodologies in industry and government, with S&T in developing countries, and with many programs of technical/economic development in Egypt.)

● Dr. Ralph Smuckler, Dean for International Programs, Michigan State University, East Lansing, Michigan. (Dr. Smuckler is a political scientist - public administrator who has served as chairman of AID's Research Advisory Committee and was Executive Director for the 18 month effort to establish a U.S. Institute for Scientific and Technological Cooperation.)

After five days of Washington interviews and studies, Mr. Krebs spent nearly two working weeks in Cairo at ASRT, NRC, the AID mission and with Egyptian JCC members. Mr. Krebs and Dr. Smuckler will attend the JCC-XI meeting in Washington, and their written report will be available soon thereafter.

ANNEX A

PLANNING ORGANIZING AND CONTROLLING
OF R&D PROJECTS
(February 15 - March 1, 1983)

- I. GENERAL Dr. Abdel-Azim
- Definitions, Elements of Management, Project Flow Charts,
Feasibility
- II. R&D MANAGEMENT PHILOSOPHY Dr. El Nockrashy
- o Types of Management
 - o Elements of a "philosophy" of management
 - o Criteria for setting a "philosophy" of management
 - o Values/Mission, Goals, Objectives, Targets/Strategies,
Policies
 - o Effective Management and the Effective Manager
- III. PLANNING Dr. El Nockrashy
- o Definitions, Purpose, Basic Questions
 - o Strategic Planning; Concept, Procedure, Evaluation
 - o Technical Planning, Concept, Procedure
- IV. MANAGEMENT BY OBJECTIVE (MBO) Dr. El Nockrashy
- o Idea, Importance, Value
 - o Two dimensions of MBO
 - o Goals and Task Performance
 - o MBO as Systems Approach
 - o MBO Cycle
 - o Strength and Weaknesses of MBO

V. CLIENT'S VIEW OF R&D MANAGEMENT

Dr. El Nockrashy

- o The Marketing Concept
- o Marketing Approach vs. Sales Approach
- o Client Relationship, and Views
- o Parameters of Client Interest (Product, Time, Budget)

VI. ORGANIZING

Dr. El-Hossary

- o Functional Organization
- o Project Organization
- o Matrix Organization
 - "Principles, Structure, Function, Advantages and Disadvantages"

VII. GUIDELINES FOR PREPARATION OF RESEARCH PROPOSAL

Dr. El-Halwagy

VIII. REPORT WRITING AS A MEANS OF PRESENTING AND COMMUNICATION RESEARCH RESULTS

Dr. El-Halwagy

- o Importance of Technical Reporting
- o Purpose and Type of Reports
- o Elements of a Report and Format
- o Preparation of the Report

IX. CONTROLLING

Dr. Abdel-Azim

- o Definitions and Relation to Planning, implementation and evaluation
- o Tools: WBS, GANTT, ABC
- o NRC and Controlling
 - before and after using the tools
 - case study Bentonite Project
- o Networks - CPM, PERT, ABC

X. EVALUATION

Dr. Abdel Azim

- o During Planning and Appraisal
- o During Operation and Control
- o During Completion and Handover
- o Post-project Evaluation
- o Evaluators (choice)
- o Of R&D Institutes

XI. CASE STUDIES

- A. MORE AND BETTER FOOD
- B. BIOGAS

Dr. GalalDr. HalwagyNOTES:

Two seminars, eleven days each.

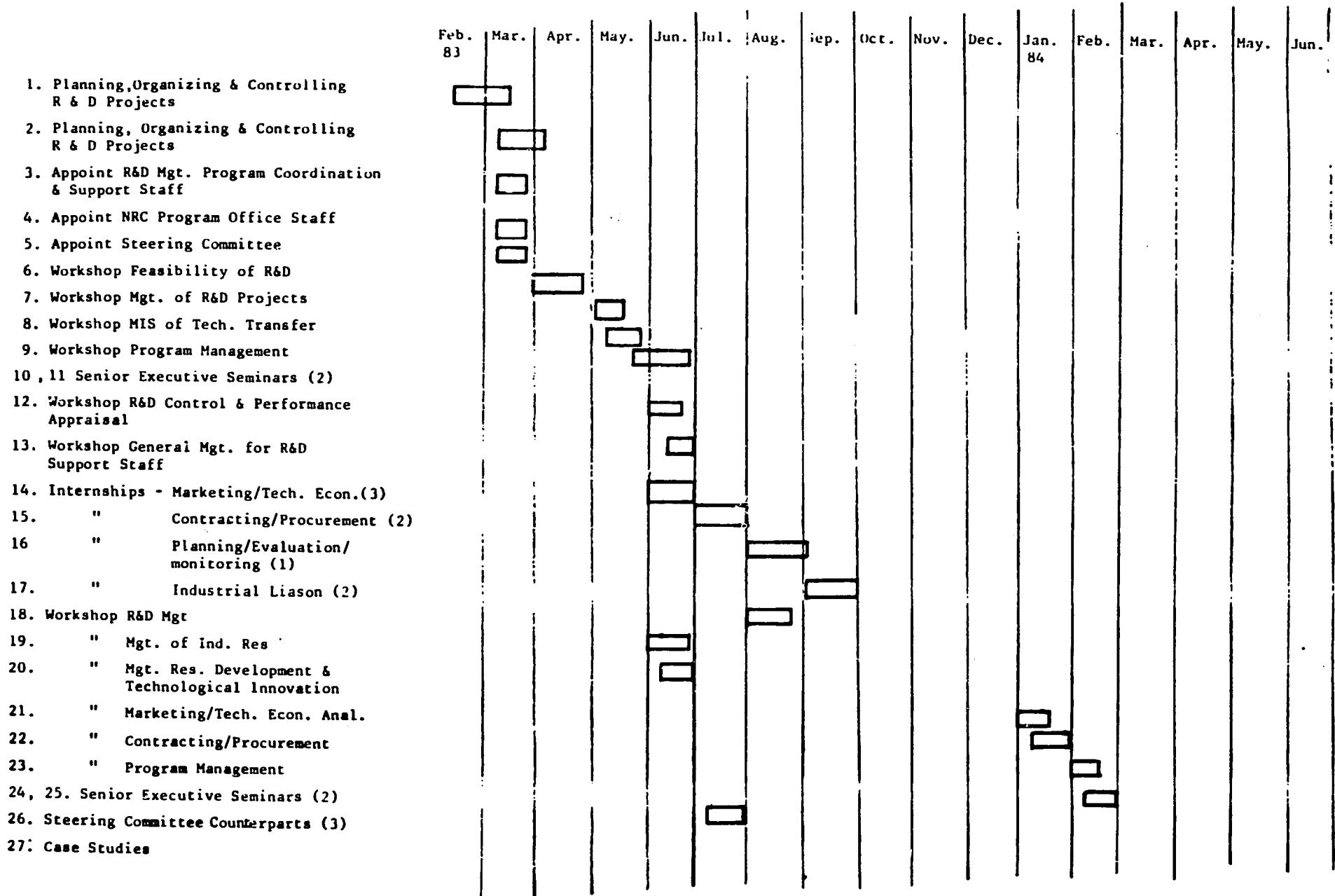
35 NRC staff first seminar, 45 NRC staff second seminar.

80 NRC staff total attendance.

The same two seminars were repeated 26 March - 2 April 1983, with 20 staff from ASRT, 19 staff from other organizations and research centers.

ANNEX B

CHART OF R & D MANAGEMENT ACTIVITIES



ANNEX C

TRAVEL FROM EGYPT

January 1, 1983 - March 31, 1983

<u>NAME</u>	<u>DATE</u>	<u>PURPOSE</u>	<u>PLACE</u>
<u>MORE AND BETTER FOOD</u>			
1. Osman Galal, Head Child Health Laboratory National Research Centre *	Jan. 23-25	Program discussions	NAS/NRC, Washington AID, Washington Nutrition Foundation, Washington
<u>DEVELOPMENT & APPLICATION OF BIOGAS TECHNOLOGY</u>			
2. Mohamed M. El Halwagi Head, Pilot Plant Lab. National Research Centre	Jan. 20 - Feb. 20	Attend symposium sponsored by Institute of Gas Tech- nology, review various bio- energy research projects, meet with U.S. advisory committee	Energy from Biomass & Wastes VII, Lake Buena Vista, Florida Environmental Health Dept., School of Public Health, University of California at Los Angeles Department of Environmental Health and Sanitary Engineering, University of California, Berkeley SRI International, Menlo Park, California New Brunswick Scientific Instruments Co., Edison, New Jersey Dr. Harold Capener, Department of Rural Sociology, Cornell University, Ithaca, N.Y. (with other panel members Dr. Philip Goodrich and Dr. T. B. S. Prakasam) Dr. David Stafford, Microbiology Dept., University College, Cardiff, Wales London Brick Landfill Ltd., Bedford, U.K.

* Transportation to the U.S. furnished by another AID program.

ANNEX C

TRAVEL TO EGYPT

January 1 - March 31, 1983

<u>NAME</u>	<u>DATE</u>	<u>PURPOSE</u>
1. Francisco Sagasti * Consultant, Lima, Peru	January 15	National S&T Policy Measures seminars
2. Hayden H. Murray, Chairman Department of Geology Indiana University Bloomington, Indiana	February 3 - 11	Investigation and Evaluation of Egyptian Bentonites for Industrial Applications
3. James Blackledge Consultant Denver, Colorado	February 19 - March 4	R&D Management Systems
4. Michael Biela Assistant Comptroller NAS/NRC, Washington	March 24 - April 5	Program financial review
5. William A. W. Krebs Vice President Arthur D. Little, Inc. Cambridge, Massachusetts	March 26 - April 8	Review of BOSTID program management; evaluation seminars with AID/Cairo and ASRT

* Transportation to Egypt provided by other sources.