

UNITED STATES GOVERNMENT

# 2-Way Memo

**Subject :** Regular Project Evaluation - FY 80-3  
Applied Science & Technology Research,006

(263-0016)

**To :** Mr. Edgar Pike, NE/TECH



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<b>SIGNATURE OF ORIGINATOR</b> <i>William Steckel</i>	
<b>TITLE OF ORIGINATOR</b> USAID/CAIRO	
Program Evaluation Officer	

FOLD

**INITIAL MESSAGE**

Pursuant to State 018541, para. 2, herewith is an attached copy of the regular evaluation of the subject project.

**Attachment:** a/s

**REPLY MESSAGE**

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## Part II

### 13. Summary:

The Grant Agreement was signed on March 29, 1977, with the Egyptian Academy of Scientific Research and Technology (ASRT). Although project implementation was considerably hampered by lengthy negotiations with both U.S. prime contractors, the National Academy of Sciences (NAS) and the National Science Foundation (NSF), the project is now progressing at a satisfactory rate. Since this project represents a departure for NAS from its normal project relationships, finalization of contractual responsibilities moved forward more slowly than anticipated, reflecting its desire to fully consider the extent to which it could mobilize NAS resources and determine its subcontracting needs. In addition, other internal NAS issues concerned the organization of workshops; setting up of panels; and the assumption of broad science policy formulation, rather than its accustomed administration of specific projects. Taken together, these factors delayed NAS entering into contractual relationship with AID. Ultimately, the contract was signed on December 17, 1977.

The NSF had indicated a willingness to participate in the scientific and technical information component of this project from its inception but, due to a series of administrative hurdles (including NSF administrative and policy changes which threatened to undermine its participation for a time), the PASA was not signed until September 25, 1978. The period from September 1978 through September of 1979 was spent in development of RFP's, receipt of proposal reviews, and contracting negotiations. NSF sub-contractors, Catholic University and Georgia Institute of Technology, began work in Egypt in October, 1979.

Despite the initial delays in implementation, significant progress in achieving the project purpose has occurred. Considerable work has been done on the research and demonstration projects as well as other components cited in sections 16-19. Other steps taken, such as sizeable core equipment purchases, short-term visits of key Egyptian and American scientific leaders and specialized training in the U.S. and Egypt, have equally contributed to achievement of the project purpose. However, in view of the above mentioned delays, this two-year project has been extended one year and a revised implementation schedule has been developed.

### 14. Evaluation Methodology:

This evaluation is the first annual evaluation which is taking place two years into the project due to the initial implementation delays. The evaluation was undertaken in order to measure implementation progress in relation to achievement of project purpose. Through this evaluation it is hoped that any implementation problems not previously identified can be brought to the fore and resolved. This analysis represents a joint effort by USAID and participating GOE entities with the assistance of

both primary U.S. contractors.

15. External Factors:

Internal changes in the management of ASRT have resulted in renewed enthusiasm in the Academy's upper ranks for this project. The Egyptian project manager is now working full-time on 263-0016.

As a result of the move of the ALESCO (Arab League Education, Scientific and Cultural Organization) headquarters from Cairo to Tunis, IDCAS (Industrial Development Center for the Arab States) is devoting its efforts to Egyptian information needs only. The director of IDCAS has agreed to allow his staff to work with NIDOC (National Information and Documentation Center) on the preparatory work for the arrival of the contractor for the Science and Technology Information component. This additional expertise should prove invaluable to NIDOC in the initial implementation phase.

16 and 17. Inputs and Outputs:

In view of the project implementation delays experienced thus far, introduction of inputs and achievement of outputs have necessarily fallen behind schedule. Revised implementation schedules have been submitted by the contractors and, with the time extension of one year, all project inputs and outputs should be achieved by end of project.

In order to present the project accomplishments to date in the most understandable form, the inputs and outputs have been integrated into one section.

Technical Assistance:

The National Academy of Science (NAS) has provided the link for the ASRT and the National Research Center (NRC) to the American science community in policy planning and management. The National Science Foundation (NSF) is responsible for the information and instrumentation technology components of the project with the National Information and Documentation Center (NIDOC) and the NRC.

1. The National Academy (NAS) contract is to assist the GOE to implement Policy Planning and Management; Research Project Support; Demonstration Project Support; and Planning for Phase II.

A. In the implementation of its Policy Planning and Management segment, NAS was instrumental in organizing the Joint Consultative Committee (JCC) composed of five members each from Egypt and from the U.S. who advise the President of ASRT on program planning, selection of projects and evaluation of results. The NAS/NRC was responsible for selecting the U.S.

members (See Annex A) and for the panel's logistic support.

Four meetings of the JCC have been held since it was founded in April, 1978: Cairo, May 1978; Washington, November 1978; Cairo, March 1979 and Cairo, November 1979. The JCC facilitate senior level joint articulation of program policies, sets goals, and periodically reviews project results. Its ability to function in a high level advisory capacity to the President of ASRT has been effectively demonstrated. The JCC has, for example, made recommendations on the selection and modification of projects proposed during its sessions. The JCC has been instrumental in keeping the project orientation to applied research and development problems, which is witnessed by the research and demonstration projects selected.

The NAS contract calls for two Senior Resident Advisors in policy planning and management, one for the NRC and one for ASRT. One position, Advisor to the NRC, has been filled by Dr. Helmut Weldes. He brings to his position at the National Research Center direct experience in R&D, R&D management, R&D marketing, venture formation and senior corporate management.

Dr. Weldes arrived in January, 1979 and has been working to the complete satisfaction of the Director of the NRC. He has been instrumental in establishing linkages with private industry for the NRC, especially in relation to the R&D sub-projects. Among his other accomplishments, Dr. Weldes has assisted in the drafting of the new by-laws of the NRC, designed a management by objectives system for the Center, and managed the Research and Development component of 263-0016. In addition, he has worked closely with the Center's Program Office in organizing all NRC data concerning its ongoing projects with domestic organizations and international donors.

The second position, Advisor to the President of ASRT, remains unfilled. One modification that may be required in the Project Grant Agreement and the NAS contract concerns the assignment of this position. The set of qualifications for the advisory position requires a special degree of personal/cultural sensitivity and, although several high-level persons were nominated for this position, the former President of the ASRT was not fully satisfied with any of the candidates interviewed. Recently the new ASRT president, Hassan Ismail, asked NAS that the Senior Advisor position be deferred to until Phase II. This will require a change in Annex I of the grant agreement and the NAS contract once USAID is officially informed.

#### B. NAS Sub Contract:

Denver Research Institute (DRI) signed May 1, 1979 for R&D management training. The signing of this sub-contract took

an inordinate period of time. Discussions between the contract division of NAS and the AID Contract Office in Washington began in mid-January with formal documentation submitted to the AID Contract Office in mid-February. Approximately eight weeks passed with no indication of a date when the AID Contract Office would approve or deny NAS the authority to subcontract with DRI; however, these contracting problems are now resolved and training is underway.

The following is the schedule for the DRI training:

June 1979 (6/18 - 7/26)	First workshop in Denver, R&D Management Methods, 3 weeks, 12 Egyptian participants
July 1979 (7/9 - 7/26)	Second Workshop in Denver, Technical Economics in R&D, 3 weeks, 10 Egyptian participants
August 1979 (8/20 - 9/7)	Third Workshop in Denver, R&D, R&D Marketing, 3 weeks, 9 Egyptian participants
Sept. 1979 (9/10 - 9/28)	Fourth workshop in Denver, Technology Assessment, 3 weeks, 11 Egyptian participants
Jan. 1980	First workshop to be held in Cairo, R&D Management Methods, 2 weeks, 40 to 50 Egyptian participants
Feb. 1980	Second workshop to be held in Cairo, Technical Economics in R&D, 2 weeks, 40 to 50 participants
March 1980	Third workshop to be held in Cairo, Technology Assessment and Systems Analysis, 2 weeks, 40 to 50 Egyptian participants
April 1980	Fourth workshop to be held in Cairo, Marketing, 2 weeks, 30-40 Egyptian participants
	Total trained in Denver: 43
	Total to be trained in Cairo: 150-200

Trainees have been and will be representatives from ASRT, NRC, universities, ministries and related industries in the public sector. The original project paper envisioned training 15 program monitors, 12 policy planners, 5 trainees in marketing (management policies) and 60 workshop participants, so that we will have already trained more people than originally envisioned by the end of this CY.

The technical assistance portion for the demonstration projects has consisted of:

U.S. panels for More and Better Food, New Crops for Arid Lands, and Bio-Gas Technology. Assistance has been given in design conceptualization, selection, implementation, monitoring of

progress and evaluation of results to varying degrees in the following R&D projects:

- a. Red Sea Fisheries;
- b. Wood Wax Utilization;
- c. Corrosion Control; and
- d. Phosphate Ore Evaluation

U.S. technical assistance has sought to help orient all R&D and demonstration projects toward Egyptian development needs and has stressed the importance of linkages with end-users in the private and public sectors.

C. Demonstration and R&D projects:

Demonstration Project I: More and Better Food

Program design was essentially completed by the first meeting of the Joint Consultative Committee (JCC) May 1978. JCC endorsement was given at its first meeting, May 1978. Advisory Committee meetings were held in May 1978 (Cairo), November 1978 (Washington), July 1979 (Washington) November 1979 and are projected for March 1980 and September 1980.

The More and Better Food project has three components: Food Technology, Nutrition and Farm System. The food technology aspect was chosen as a result of discussions with food industry people who identified cottonseed oil and cheese manufacturing problems on which the NRC might be able to do significant research.

**Food Technology: Oilseed Extraction.** The laboratory benchwork (1kg.) work was essentially completed by February 1979; scale-up equipment design to 15 kg. based upon factory specifications at Al Badrachin completed by March 1979 and pilot plant testing begun. Following this work, a further scale-up to 50 kg. equipment will be undertaken.

**Food Technology: Cheese making.** A consultant visited NRC/Cairo in September 1978 and, in collaboration with the Egyptian staff in the NRC dairy laboratory, suggested a series of pilot plant scale steps to investigate production of Damietta cheese using mixtures of fluid milk and imported dry fat milk concentrate. Laboratory (bench-scale) R&D is being performed but must be evaluated at a pilot-plant scale prior to adaptation at Misr Dairy (Damietta). A key piece of equipment (stainless steel homogenizer) has been specified for the pilot-plant but has not yet been ordered. Because of delivery schedules and time required for building the pilot plant at the NRC/Cairo, the process adaptation to Misr Dairy will occur during Phase II (October 1980).

## Nutrition Research

The nutrition - related component assesses the target population's nutritional status. There is currently a protein - rich food Supramin, manufactured in Egypt by a pharmaceutical company, which has the potential for meeting some of the nutritional requirements for pre-school and older children. Work in this component began in January of 1979, with a food scientist, food biologist and food nutritionist working on problems ranging from unacceptable food consistency to short shelf life. It will probably take up to twelve months to get results from the current research, but it is hoped that experiments introducing this cereal-based food in combination with some traditional foods into villages will take place by October of 1980.

## Farm System:

The farm system-related component deals with the problems of nutrition and the developmental process in general and aims to show that science and technology can have an impact on these problems. In order to further investigate what impact could be achieved, the NRC enlisted the assistance of ORDEV, the Organization for Reconstruction and Development of Egyptian villages, which worked on the selection of villages. Ten villages were selected initially and were interviewed using questionnaires. These ten were then narrowed to three, one village in a valley, one outside of a valley and one a new settlement. The six criteria for selection of the villages were: agriculturally-based; availability of health and agriculture services; accessibility by road; farm size of five feddans or less; representation of villagers to participate in the process of data collection and data interpretation.

An executive committee and village committees have been established, with the Secretaries General of the respective Governorates as members. Recently two villages were selected of the three, Kafra Khadra in Mounoufia Governorate and Omar Makram in the Mouderiya El Tahrir (El Tahrir province) Governorate.

Coordination among all the components of the More and Better Food is essential and is proceeding as planned. The farm system component has a significant constraint in that testing of new technologies is dependent both upon data collection for the villages chosen, (i.e. soil analyses, water management practices, seed and fertilizer availabilities, etc.), and upon the actual growing season. Thus, component coordination during implementation has time-dependent aspects (e.g. natural growing seasons) which can be accommodated in the plans to a degree, but not controlled absolutely. Training thus far under this project has consisted of four orientation visits to appropriate facilities in the U.S.

## Demonstration Project II. Biogas Technology:

The preliminary program design was presented to the November 1978 JCC meeting; the project was approved with the request

that a) refinement of the plan be made and b) a joint advisory committee be created to review technical details. The advisory committee met in January 1979, and its recommendations were incorporated into the final project proposal submitted to and approved by the JCC at its March 1979 meeting. The fact finding phase included a literature survey (core effort was completed in June 1979) and valuable information gathering trip to the Economic and Social Commission for Asia and the Pacific (ESCAP) in Bangkok by one team member (April 1979). The biogas demonstration project will take place in a village not yet selected in Giza Governorate and a new village, Omar Makram in Mudiriayat, El Tahrir Governorate.

The NAS advisory committee met in the U.S. with the project coordinator (June 1979) and the principal investigator (July 1979). An NAS committee member Dr. Philip Goodrich joined five key Egyptian team members on their visit to India, China, and Thailand in November 1979 to gain experience from ongoing biogas research and rural applications in those countries. A joint committee meeting is anticipated in early 1980 and at the conclusion of Phase I to evaluate results to date and make recommendations for continuing activity in this area.

The biogas technology demonstration project seeks to prove the economic feasibility of establishing biogas units in rural areas for the production of gas. This technology would allow the farmer to put back into his fields organic wastes which he now burns for energy. A digester fed with raw wastes produces methane for energy, as well as a rich organic fertilizer.

Sociological surveys and analyses of the two selected test villages continued through August 1979, with the continuing areas of focus for the sociological group to be determined thereafter. Laboratory and bench scale work commenced early in 1979 and will continue through Phase I. Construction of a prototype Chinese digester at the NRC is completed and is in working order.

Fundamental microbiological work is concentrating on the study of the selective inhibition of the viability of *Ascaris* Egg in biogas digesters and will continue through Phase I. In addition, fertilizer evaluation activities are being undertaken in conjunction with the other studies throughout Phase I.

Proposed Demonstration Project: New Crops for Arid and Semi Arid Zones

The JCC considered a preliminary proposal at its November, 1978 meeting and recommended, in view of the project's potential for agricultural production, that further design be undertaken through a joint committee. The joint committee met in January 1979 and in March 1979 and the JCC recommended that the project be undertaken with an orientation to non-conventional crops.

The Egyptian Executive Committee for the project has selected two sites (El Fayoum Governorate and the New Valley Governorate)

where forty acre experimental sites will be developed in Phase I. An Egyptian Executive Committee member visited NAS committee members and other U.S. scientists for consultation in July 1979. Initial activities will include acquisition and installation of equipment and laboratory facilities at the sites, NRC, and Al Azhar universities; seed procurement; and planting and training for key personnel. Two joint committee meetings are anticipated before the conclusion of Phase I.

Approved R&D Project: Phosphate Ore Evaluation

A preliminary R&D design was presented to the first JCC meeting in May 1978 but additional information was requested. After preparation of the requested background data, a visit to U.S. laboratories and industries engaged in phosphate ore beneficiation and phosphate fertilizer production by an NRC/Cairo chemical engineer, and an oral presentation to JCC at its November 1978 meeting, the phosphate ore evaluation project was approved for implementation. The purpose of this project is to upgrade the ore beneficiations of the phosphate ores for their utilization as fertilizers.

Three members of an NAC/NRC advisory panel on phosphate ore beneficiation and chemical processing met in Cairo early in April 1979 to assist NRC/Cairo scientists and engineers in reviewing the project design, equipment needs and staff training requirements. Additional interaction among the joint groups took place in January and are planned again for March 1980.

NRC/Cairo bench scale ore beneficiation tests, particularly on the Abu Tartour Phosphate materials, have been conducted during 1979 with promising indications that high concentration iron impurities such as pyrite are not detrimental to beneficiation. Results, however, must be checked at the pilot plant scale in order to verify the findings under continuous flow sheet operation.

During October and November 1979, four Egyptian scientists/engineers from NRC/Cairo participated in training courses at the International Fertilizer Development Center (IFDC) and the Tennessee Valley Authority (TVA) phosphate fertilizer research facilities, both at Muscle Shoals, Alabama. Pilot plant scale beneficiation and chemical processing tests await completion of facilities at NRC/Cairo. (Note: A chemical processing pilot plant may not be available in Egypt until Phase II. In that event, samples may have to be run at the IFDC in the U.S.A.) Adaptation of flow sheet design, originally projected for mid 1980, will be delayed until Phase II when pilot plant scale testing is completed.

Approved R&D Project: Wool Wax Utilization

The Wool Wax Utilization project is one that arose from discussions during an NRC/Cairo American Chemical Society (ACS)

workshop in 1977. It was originally proposed within a group of projects for direct collaboration between the ACS and NRC/Cairo as an Egypt-U.S. applied chemistry program. When funding was not available, the wool wax utilization project was one of two proposed by NRC/Cairo, the ASRT requesting a project design for review at its March 1979 meeting.

The ACS sent Mr. Louis Mizell of the International Wool Secretariat, Wool Bureau Technical Center, New York, to Cairo in January 1979 to assist NRC/Cairo and the Misr Beida Dyers Company in the final project design. The project design was approved by the JCC in March 1979 and incorporated into the program as an R&D Project.

In order to proceed with this work at NRC/Cairo, additional equipment is required. Specifications have been made; the University of Wisconsin is assisting AID and the Afro-American Purchasing Company (AAPC) in procurement. Delivery of all equipment, however, may require until March 1980. Pending arrival of equipment at NRC/Cairo, Misr Beida Dyers is proceeding with bench scale determinations and market surveys for wool wax products. Actual application in the Misr Beida Dyers plant will be delayed until Phase II.

Approved R&D Project: Corrosion Causes and Control

The project Corrosion Causes and Control is the second applied R&D activity arising from the 1977 NRC/Cairo-ACS workshop. In January 1979, a two person advisory team visited NRC/Cairo with the assistance of the ACS. The team members were Dr. Henry Leidheiser, Director, Center Surface and Coatings Research, Lehigh University, Bethlehem, Pennsylvania, and Earl Snavely, Mobil Research and Development Corporation, Dallas, Texas. Their consultation with NRC/Cairo scientists resulted in a project proposal for the JCC in March 1979. The proposal was approved by the JCC with the suggestion that sub-elements on pitting and galvanic corrosion be deferred until the more applied aspects of developing petroleum industry corrosion inhibitors are emphasized.

Industrial field studies have proceeded during 1979 to identify and characterize the more serious corrosion problems. Laboratory work at NRC/Cairo will be conducted on the industry problems; however, the laboratories require additional equipment for this work. As in the case of the wool wax utilization project, most of the equipment is not expected to arrive prior to March 1980. Training of NRC/Cairo scientists in the USA on new techniques in industrial corrosion control will occur early in 1980 (approximately 3 months). Application and monitoring of corrosion control methods in industry should begin by September 1980 and continued into Phase II for 18 months.

## Approved R&D Project: Red Sea Fisheries

The project was initially proposed at the May 1978 JCC meeting. A revised proposal was approved at the November 1978 meeting and an NAS panelist visited Egypt in April 1979 for consultation. In view of the complexities of the project in initiating surveys in the remote Foul Bay area such as chartering a vessel, procuring equipment, etc., the degree to which goals can be reached in Phase I is unclear. The development of this project will be further clarified following the November 1979 JCC meeting.

The original Project Paper called for five applied research and development and two large scale demonstration projects to be underway by the end of Phase I. With the continued success of the above mentioned projects, all seven of these will be producing preliminary results as originally envisioned. The implementation delay experienced in initiating these R&D projects has caused training activities to be delayed. While the project paper specifies 150 trainees in this area, this number is likely to be reduced to 40 during Phase I.

### D. Phase II Planning:

The Applied Science and Technology project has been viewed from its inception as a two-phase project in which Phase II, if approved, would seek to intensify implementation of activities begun in Phase I and initiate other activities which would further achievement of the project's goal. As the project agreement requires that all principal entities involved in Phase I collaborate in the Phase II planning process, USAID/C, the ASRT, the NRC, the NSF and the NAS/NRC have been the relevant entities.

At the November 1978 JCC meeting a schedule for planning of Phase II was approved. That schedule called for the approval of criteria for Phase II planning and a preliminary review and ranking of proposed projects during the March 1979 JCC meeting, the third JCC meeting. At that meeting, it was recommended that a Phase II planning document be presented for discussion at the Fourth meeting to be held in Cairo in November 1979. The Fourth meeting is to also review achievements of Phase I, evaluate the On-going research projects; establish priorities for Phase II; and funding estimates for new and ongoing projects.

In June of 1979 in Washington, joint elaboration of the aforementioned planning document was begun. The Egyptian counterparts brought to those sessions a document reflecting their decisions outlining on the course which the project might take during a Phase II. In general, the participants decided that those activities begun during Phase I which were found to be successful and which had not come to their conclusions should be continued during Phase II. These include: activities in policy planning and management and demonstration and R&D

activities; implementing the STI system; strengthening the system for instrumentation and maintenance and repair of core scientific equipment facilities; planning for follow up beyond Phase II; and, recommendations for new projects in Phase II.

In addition, all the activities under Phase I were considered individually in order to determine optimum, maintenance and improved (combination of maintenance and optimum) funding level requirements for Phase II activity continuation.

The fifth JCC meeting will be held in February 1980. At that time the JCC will approve the list of projects for Phase II and approve the format and contents of the Phase II planning document.

## 2. National Science Foundation:

### A. Science and Technology Information Service (STI):

Following the signing of the PASA between AID and NSF in August of 1978, it was determined that one of the objectives of Phase I of the project would be to establish a basis for longer term development of a national system of STI services. This could best be accomplished through four inter-related activities:

- a. Design study - to develop an overall scheme for a projected nationwide system of STI services (focussing on NIDOC).
- b. Supplying of current information materials - to provide current journals and reports essential to basic and applied research and technology.
- c. Computer accessed information delivery service - to demonstrate the "selective dissemination of information" mode of providing information.
- d. Training of information specialists - to assist in mastery of certain basic skills, techniques and procedures for information processing.

The search for and selection of the two major sub-contractors continued from the signing of the PASA until September 1979. Georgia Institute of Technology and Catholic University were selected for the design study and training components, respectively. The contractor selection process was very lengthy as separate technical evaluation panels were established for each RFP. These panels were composed of NSF and other USG personnel, U.S. university and private industry representatives, as well as the Egyptian Academy. To resolve a final selection, best and final offers were solicited, again with technical evaluation by US and Egyptian members of those offers.

In January and in September, 1979, Mr. Eugene Pronko, NSF Project Officer, visited Cairo to confer with ASRT and NIDOC on,

among other things, preparation on the Egyptian side for contractor assistance. An organizational model for Egyptian implementation of project efforts and interaction with contractor or technical assistance was developed. The model consists of a Steering Committee of five to seven members drawn from the interested communities or sectors (ASRT, NRC, NIDOC, universities, government agencies, industry, etc.). The Committee is chaired by NIDOC and an Egyptian liaison officer who will be nominated by the Committee and appointed by ASRT, and serve as secretary.

The work of the Steering Committee and the implementation of project tasks currently underway, is being performed initially through four Task Groups: (1) Surveys; (2) NIDOC Systems Study; (3) Information Manpower; and (4) National Information Policy and Plan. Each Task Group is led by a member from the Steering Committee or other qualified persons appointed by the Committee. Working members of the Task Groups are drawn from among the interested communities or sectors plus IDCAS. Contractor assistance and guidance was supplied in October with the arrival of Georgia Institute of Technology, consultant.

The need for a full time Project Manager on the Egyptian side has been recognized. NSF and ASRT are giving the matter their fullest consideration and it is expected that a qualified individual to work with and provide liaison with the contractors will be appointed in 1980.

During CY 1980, it is also planned that at least 12 of the 20 originally planned information specialists will be sent to the U.S. for short term training individually tailored to their needs. NIDOC is identifying these people now so that their English language capabilities can be ascertained and upgraded as necessary.

To date, three orientation and training visits have been made by NIDOC personnel to American STI institutions and an NTIS (US National Technical Information Service) training session. A telex system has been installed at ASRT, providing rapid access to STI data bases. In addition, five microfiche readers have been purchased and installed at NIDOC and a \$10,000 account at NTIS established for purchase of a core collection of microfiche in agriculture and food, chemistry and energy. Initial NTIS accounting problems have been resolved and approximately 2000 documents in microfiche and printed documents have been received to date.

NSF has also provided a printed index to 2,500 NSF sponsored reports in a specialized collection dealing with applications of research findings. A microfiche set of these documents has been provided. To support the training development of information specialists, a core collection of 30 basic reference works in the fields of information science and technology was selected and purchased for NIDOC.

At the request of ASRT and USAID, NSF recommended a U.S. expert consultant in building design for libraries and information centers to consult with ASRT on its building plan and program for a new NIDOC in Nasr City.

A three week intensive workshop is planned to be held in Cairo in 1980 to provide basic training in mastering the skills of abstracting and indexing. NIDOC has had discussions with the National Federation of Abstracting and Indexing Services (NFAID) which has submitted a preliminary plan and design for this workshop. Included in the workshop design will be a component dealing with abstracting and indexing matters relevant to Arabic speaking countries. The exact date of the workshop, a final plan, and budget are yet to be finalized.

### B. Instrumentation Technology

The National Science Foundation sub-contracted with the University of Wisconsin (UW), Instrumentation Systems Center (ISC) to assist in development of specifications for equipment procurement and training activities in instrumentation maintenance and repair (M&R). To initiate the training in Egypt, 141 students from five Egyptian universities (Minia, Assiut, Tanta, Alexandria, Cairo) plus the NRC and the Egyptian Instrumentation Center (SIC) have had short term training in basic electronics at the American University in Cairo. Four university students have been sent for M&R training in electronic equipment at the National Institute of Health and six National Research Center (NRC) and SIC students have been trained at the University of Wisconsin in same discipline, thus reaching the goal of 10 trained technicians specified in the project paper. NIH and University of Wisconsin plan to train another 40 Egyptian technicians in maintenance and repair of scientific equipment.

Approximately half of the \$2.1 million in core scientific equipment has arrived in Egypt. During the July-August period 1979, two consultants from the University of Wisconsin spent one month at the NRC inspecting the equipment which has arrived. The ISC advisors who assisted NRC encountered some problems in storage of the equipment at the NRC, as alterations in the basement of that facility are not as yet completed and access to stored equipment required lengthy procedures. NRC management has assured USAID that this problem will be resolved before the consultants' return inspection visit in the beginning of CY 1980.

It was also determined in August by the NRC, USAID and UW that a senior U.S. instrumentation specialist resident in Cairo would greatly improve transfer of on-the-job training skills, as well as handle technical management problems as they arose. The NSF is now considering approving such a position.

## 18. Purpose

"To improve the institutional capability of the Egyptian S/T community to develop and manage research programs to solve priority development problems."

This evaluation reviews and examines the first two years of phase one of a two phase project term effort whose objective is to improve the effectiveness of Egyptian scientific and technological resources in applied research directed toward national development goals. The first phase, under review, is aimed at improving the management of applied research, and is preparatory to a more comprehensive follow-on to be designed during the implementation of this project. Because the current phase involved new methods of R&D management planning, coordination and execution for Egyptian institutions, only limited developmental/economic impacts can be expected to appear as quantifiable outputs during Phase I (ending October 30, 1980). For this reason, Phase I EOPS focuses on design of Phase II follow-on activity. (See #17 above for progress towards improved management capabilities.) A special evaluation to determine whether or not sufficient justification exists for a Phase I follow-on is scheduled for April 1980.

As evidence of the projects' success in strengthening R&D management at the ASRT, one may cite the overall management plan for the Applied Science and Technology Project which was submitted to the JCC at its third meeting (March 1979). The management plan, prepared by the Academy with the advice of the U.S. advisor to NRC, formally outlines ways in which inputs into the overall program are to be coordinated, monitored and evaluated.

The R&D Division submitted this plan to the Academy Council. (The Council acts as senior advisory board to the ASRT and includes among its members all directors of institutes, presidents of universities, and minister level officials). The Council approved the plan and the ASRT started on January 1979 to apply this new system of management.

## Special Linkages

There are several linkages with industry as a direct result of this project as noted above. One of particular significance involves NAS/Senior Advisor assistance to the NRC in negotiating a Survey Agreement with an Arabian Company for solar hot water plant technology developed by NRC. This will be the first technology package sale in which the NRC has been involved.

## Reports Monitoring

Implementation reports on technical aspects of the project are furnished by ASRT and NRC/Cairo for each of the semi-annual meetings. In addition, NAS furnishes AID/Cairo with a report of each panel or technical visit, a semi annual report, and periodic fiscal reports (through the AID contract management office in Washington). These are on file in HSTD.

## 19. Goal/Subgoal

" To reorient the scientific and technical research community towards those types of research which are of priority importance and are applicable to solving national development problems." This Phase I project consists of six components:

- Policy Planning and Management
- Research Project Support
- Demonstration Project Support
- Provision of Scientific Equipment
- Science and Technical Information
- Planning for Phase II

### Rationale of the Project

The Government of the Arab Republic of Egypt is fully aware of the important role that science and technology can play in the development of its economy, and in the solution of major social, environmental, and other problems. A number of constraints limit the effective utilization of the scientific and technological community's considerable institutional and personnel resources to solve such problems. These constraints include:

- (1) shortage of executive skills to formulate policy and to plan, select, staff and monitor projects;
- (2) limited experience in the management of large scale interdisciplinary research projects;
- (3) a dearth of essential equipment needed for research;
- (4) weak incentives for scientists and technicians to concentrate on applied research; and
- (5) a paucity of scientific and technological information.

### Receptivity to Project Implementation

From the standpoint of the NAS, there has been excellent and sustained interest on the part of the groups involved, and receptivity to U.S. inputs is high. Both in ASRT and in NRC/ Cairo the leadership is very competent, dedicated to the project goals, highly motivated, hard working, and open to suggestions coming from U.S. panelists and/or NAS staff. Working relationships are close and the spirit of joint participation in projects is high. This is further highlighted by the activity under the Demonstration Project More and Better Food. The demonstration project was approved for implementation at the First JCC Meeting in May 1978. Two extensive progress reports have been presented (Second JCC Meeting, November 1978 and Third JCC Meeting, March 1979).

At the most recent project review by the U.S. Panel (Washington, November 1979) the Egyptian team for More and Better Food was commended for:

- (1) on schedule progress;
- (2) successful efforts to incorporate groups outside NRC/Cairo in the planning of the village demonstration and field test;
- (3) the excellence in technical reporting; and
- (4) management plan.

The U.S. Panel felt that the management of the More and Better Food project illustrates the type of result which the overall Applied Science and Technology Project is striving to achieve.

## 20. Beneficiaries

Research and demonstration projects are designed for applied use and to deal with problems of national interest. Various segments of Egyptian society will benefit directly from the research and technology depending upon the specific area of the sub project. Since there will be a wide range of sub project aimed at industrial, agricultural and social improvements, there will be a concomitant wide spectrum of the population directly benefited.

## 21. Unplanned Effects

None

## 22. Lessons Learned

The Science and Technology Project represents an extremely complex set of inter connecting elements-- encompassing broad policy formulation as well as discrete project management (e.g. the Demonstration and R&D Projects). Among the original assumptions either explicitly stated or implied in the project paper and the Project Grant Agreement are:

- Egypt has a reservoir of highly qualified technical and scientific manpower available for applied R&D.
- Egypt has a variety of institutional arrangements that can be mobilized to do applied R&D.
- Egypt, through the ASRT and the NRC/Cairo, has leaders who can plan, manage, direct, monitor and evaluate a new effort in applied R&D.
- Projects can be undertaken relatively quickly and managed to give desirable results in the medium term (3 years).
- U.S. inputs can be matched to Egyptian needs and made available through such organizations as the NAS/NRC and NSF in Washington.
- Training inputs as well as equipment, technical information and technical assistance can be jointly managed by Egyptian

and U.S. specialists to catalyze desirable results.

- Difference in management techniques among institutions in Egypt and the U.S. can be overcome, so that joint activities may proceed.

- Efforts by both the Egyptian and U.S. groups responsible for the Applied Science and Technology Project can be sustained, even in the face of the large geographic distance between the two countries and the lack of consistent, reliable electronic communication facilities.

All the above assumptions have proved to be valid, although the project was slow in gearing up because of planning requirements, administrative delays in the U.S. and in Egypt, and time required to mobilize manpower skilled in research and development management.

The United States JCC panelists are:

Dr. H. Guyford Stever, currently an international consultant to the Government of Saudi Arabia (science and technology manpower, university training, R&D programs) and consultant to several major U.S. science-oriented corporations such as TRW and Hewlett Packard. Dr. Stever was science advisor to President Ford, served five years as director of the National Science Foundation, was twelve years president of Carnegie-Mellon University (Pittsburgh) and a long term professor/department chairman at MIT. He is a member of the National Academies of Science and Engineering, serves on the Governing Board of the National Research Council and is chairman of the Council's Assembly (equivalent to "Division") of Engineering.

Dr. George Zugliarello is President of the New York Polytechnic Institute, an institution formed in 1979 by the merger of the Brooklyn Polytechnic Institute and the College of Engineering, New York University. New York Polytechnic Institute is a major, private science and technology education and research institute ranking in quality with such universities as MIT, Caltech, Michigan and California/Berkeley (based upon the quantity of R&D contracts supported by NSF, Defense, NIH and other U.S. Government funding institutions). Dr. Bugliarello was Dean of Engineering at the Chicago/Circle Campus, University of Illinois, and a Professor of Biomedical Engineering prior to becoming President of New York Polytechnic. He has served the NAS/NRC as Chairman of the Committee on the Innovative Uses of Technology, a member of the Board on Science and Technology for International Development and many workshop/seminar activities in Venezuela, the Philippines and the U.S.

Dr. Mary Carter, is a biochemist and currently the Director, Southern Regional Laboratory, U.S. Department of Agriculture. The Southern Regional Laboratory is responsible for R&D work in cotton, cottonseed oil, textiles, peanuts, adaptation of soy beans to semi tropical environments and other projects related to conditions that exist in Egypt. She has served NAS/NRC on other panels and committees and was a participant in a workshop on R&D management planning and evaluation in Peru.

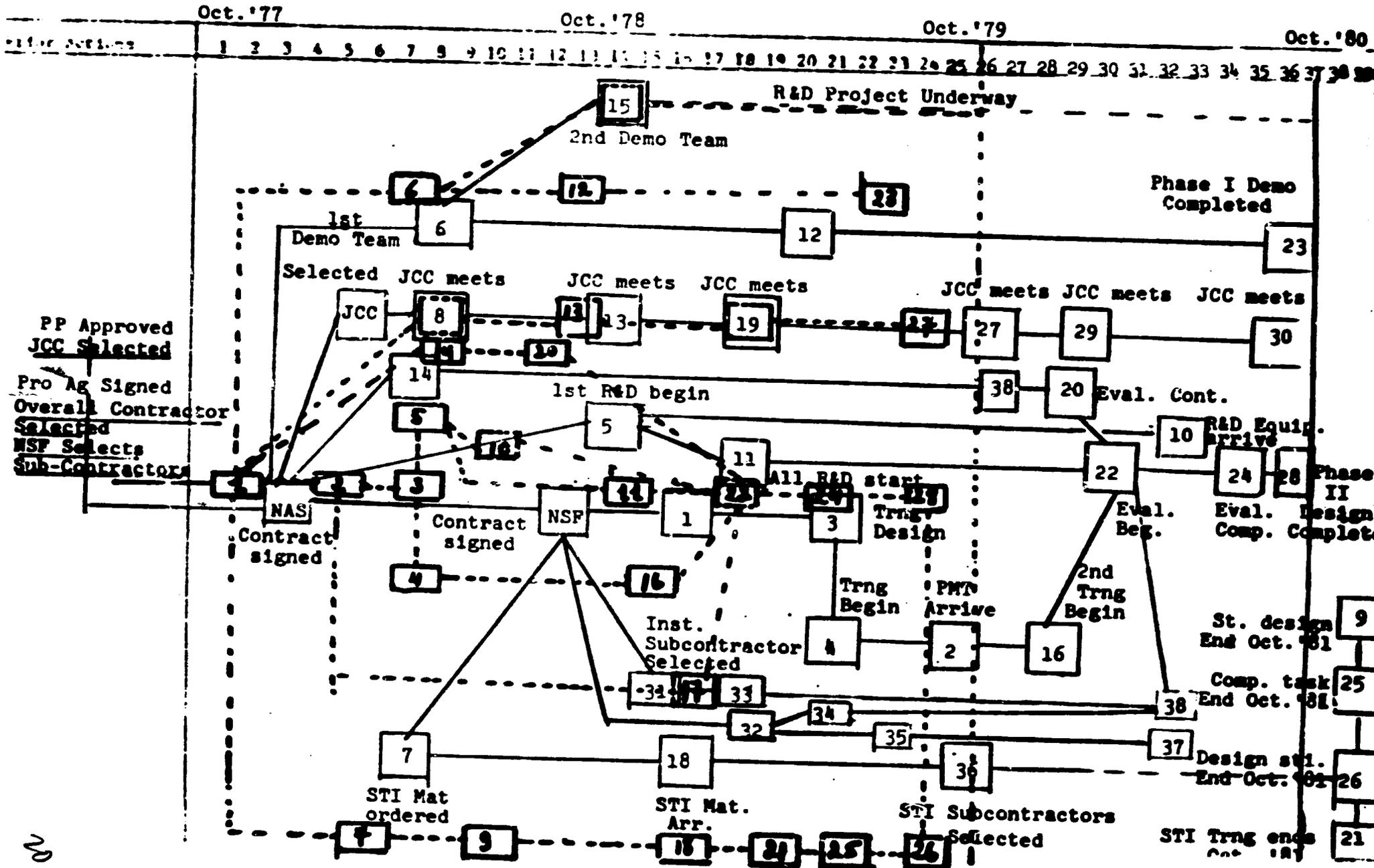
Dr. James Hillier is a physicist who spent his entire professional career at the RCA laboratories in Princeton, New Jersey. Prior to his retirement in January 1978 he was director of the laboratory. He brings to the U.S. JCC panel the kind of critical R&D management experience which comes from the necessity to review constantly cost-benefit analyses of R&D. Dr. Hillier is a member of the National Academy of Engineering as well as the Board of Overseers for the College of Engineering, Cornell University.

Dr. Gilbert White was formerly director and now a senior professor at the Institute for Behavioral Science, University of

Colorado. He is a geographer by profession with long experience in water use planning, river basin development, and environmental effects of large irrigation projects. For several years he has served the Ford Foundation as a consultant on water management and international development. He travels to Egypt an average of twice yearly on Ford Foundation activities. He is a member of the NAS and chairman of its Environmental Studies Board.

ORIGINAL PERT

CURRENT PERT



20

## CURRENT PERT & Original pert

1. NRC advisor arrives (Current), NRC and ASRT advisors arrive
2. NRC and ASRT policy, management teams arrive (original pert)
3. ASRT, NRC, policy management training plan designed
4. Training management policy program begins
5. First R&D projects approved
6. Demonstration I project team arrives
7. Information team (materials) identifies needs
8. First meeting JCC
9. STI design team completes work
10. First R&D project equipment arrives
11. Remainder R&D projects (ASRT) underway
12. Equipment for demonstration project (1) arrives
13. Second meeting JCC
14. 1st Pro Ag Amendment signed
15. Demonstration project (II) designed, approved, including training, equipment plan
16. Second tranche training begins
17. Second ASRT, NRC policy, management teams arrive
18. STI materials delivery begins
19. Third meeting JCC
20. Evaluation contract signed
21. STI training completed
22. Evaluation begins, S&T, STI
23. Demonstration project (I), first phase completed, data available, Phase II designed
24. Evaluation completed
25. Computer access task completed
26. Design STI (II) completed
27. Fourth meeting JCC
28. Design phase II completed
29. Fifth JCC meeting
30. Sixth JCC meeting
31. Inst. Tech (IT) 1st subcontractor (NIH) selected
32. Inst. Tech (IT) 2nd subcontractor (Wisconsin U.) selected
33. IT training begin at NIH
34. IT training begin at Wisconsin
35. Core equipment arrives
36. STI subcontractors (Catholic U. and Georgia Tech) selected
37. Core equipment completed
38. IT training ends both at NIH and Wisconsin
39. Second Pro Ag Amendmend signed