

**WATER AND SANITATION  
FOR HEALTH PROJECT**



**COORDINATION AND  
INFORMATION CENTER**

Operated by CDM FIVE  
for the U.S. Agency  
for International Development

1611 N. Kent Street, Room 1002  
Arlington, Virginia 22209 USA

Telephone: (703) 243-8200  
Telex No. WUI 64552  
Cable Address WASHAID

CDM FIVE is operated by  
Camp Dresser and McKee  
Incorporated; Principal Col-  
laborators: Center for Educa-  
tional Development in  
Health, Boston University;  
International Science and  
Technology Institute; Re-  
search Triangle Institute;  
University of North Carolina  
at Chapel Hill.

**EVALUATION OF YEMEN  
WATER SUPPLY SYSTEMS  
MANAGEMENT PROJECT**

**WASH FIELD REPORT NO. 22**

**SEPTEMBER 1981**

**Prepared For:  
USAID Mission to the Yemen Arab Republic  
Order of Technical Direction No. 39**

WATER AND SANITATION  
FOR HEALTH PROJECT



COORDINATION AND  
INFORMATION CENTER

Operated by CDM FIVE  
for the U.S. Agency  
for International Development

1611 N. Kent Street, Room 1002  
Arlington, Virginia 22209 USA

Telephone: (703) 243-8200  
Telex No. WUI 64552  
Cable Address WASHAID

CDM FIVE is operated by  
Camp Dresser and McKee  
Incorporated; Principal Col-  
laborators: Center for Educa-  
tional Development in  
Health, Boston University;  
International Science and  
Technology Institute; Re-  
search Triangle Institute;  
University of North Carolina  
at Chapel Hill.

September 23, 1981

Mr. Charles Ward  
Mission Director  
USAID Mission  
Sana'a, Yemen

Attn: Mr. Zachary Hahn

Dear Mr. Ward:

On behalf of the WASH Project, I am pleased to send you fifteen copies of the final report of Mr. Martin Lang and Mr. Clarence Calbert, who visited Yemen in June to evaluate the Water Supply Systems Management Project.

This work was requested of the WASH Project by the Office of Health (S&T/HEA) under Order of Technical Direction No. 39 dated May 5, 1981.

If you have any questions or comments on this report, we would be happy to hear from you.

Sincerely yours,

Dennis B. Warner, Ph.D., P.E.  
WASH Project Director

BF/RS  
Enclosures

cc: Mr. Victor W.R. Wehman, Jr.  
S&T/HEA

WASH FIELD REPORT NO. 22

YEMEN ARAB REPUBLIC

EVALUATION OF YEMEN WATER SUPPLY SYSTEMS  
MANAGEMENT PROJECT

Prepared for USAID Mission to the Yemen Arab Republic  
under Order of Technical Direction No. 39

Prepared by:

Martin Lang, P.E.  
and  
C. E. Calbert, Dr.P.H.

September 1981

Contract No. AID/DSPE-C-0080  
Project No. 931-1176

## TABLE OF CONTENTS

<u>Chapter</u>		<u>Page</u>
	EXECUTIVE SUMMARY.....	iv
1.	INTRODUCTION.....	1
2.	BACKGROUND.....	4
3.	FIELD INVESTIGATIONS.....	14
	3.1 Sana'a Branch Evaluation.....	14
	3.2 Taiz Branch Evaluation.....	15
	3.3 Hodeida Branch Evaluation.....	17
4.	EVALUATION OF THE TRAINING COMPONENT.....	21
	4.1 Purpose.....	21
	4.2 Evaluation Methodology.....	21
	4.3 Current Status of Training.....	23
	4.3.1 Inputs.....	23
	4.3.2 Outputs.....	23
	4.3.3 Inputs and Outputs from Other Cooperating Donors.....	25
	4.4 Evaluation of Outputs.....	26
5.	SUMMARY.....	29
	5.1 General.....	29
	5.2 Branches.....	30
	5.3 Financial.....	31
	5.4 Administration.....	32
	5.5 NWSA General.....	32
	5.6 Training.....	32

6.	CONCLUSIONS.....	34
7.	RECOMMENDATIONS.....	36

APPENDICES

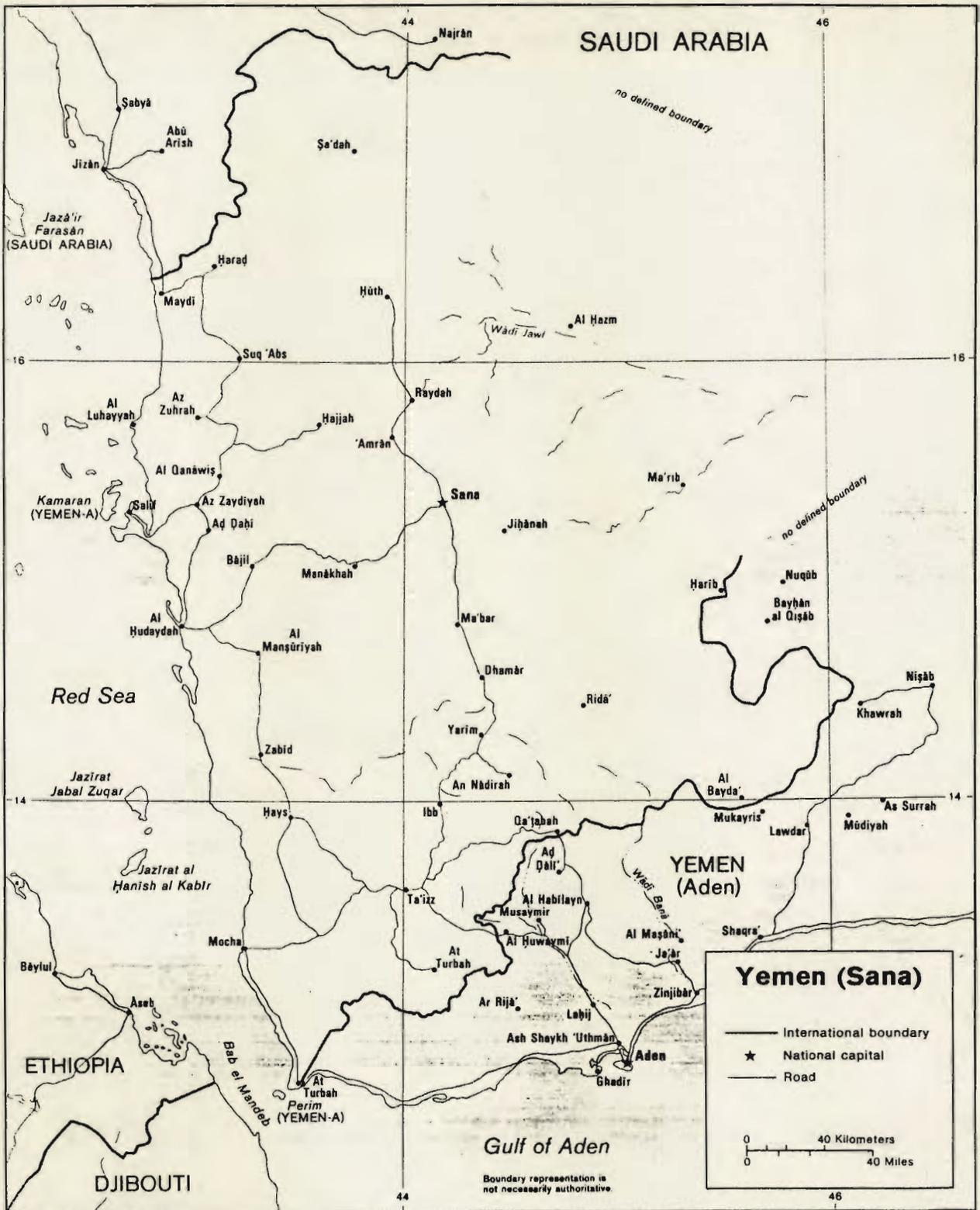
A.	Order of Technical Direction.....	40
B.	Itineraries.....	55
C.	Officials Interviewed.....	58
D.	Documents Reviewed.....	62

FIGURES

1.	Map of the Yemen Arab Republic.....	iii
2.	NWSA Headquarters Organization.....	10
3.	NWSA Hodeida Branch Organization.....	11
4.	NWSA Sana'a Branch Organization.....	12
5.	NWSA Taiz Branch Organization.....	13

TABLE

1.	AID Estimate of Remaining Resources, AID Project No. 279-0028.....	20
----	---	----



Base 504377 2-80 (544968)

Figure 1.

## EXECUTIVE SUMMARY

The original project concept for upgrading the National Water and Sewerage Authority (NWSA) of the Yemen Arab Republic into a free-standing technically self-sufficient and self-financing utility, was predicated on an exquisitely interlocked timetable of concurrent actions by NWSA, the U.S. Agency for International Development (AID), multiple consultants, multiple contractors, multiple advisers, the World Bank, and Arab and other donors. Activities included the training of a substantial number of people in the United States and third countries, and in Yemen in long and short term academic, managerial, and vocational programs.

The end product was to have been a well-trained cadre of engineers proficient in all phases of water treatment construction, financial managers who are competent in new computer accounting programs, water and wastewater plant operators, skilled electrical and mechanical maintenance and repair foremen, and skilled construction and piping artisans.

This cadre was originally planned to be in place with the requisite numbers and mixture of academic and non-academic skills by 1983, in time for the improved operation and management of the upgraded and expanded water treatment systems in Sana'a, Taiz, Hodeida, Ibb, and Dhamar. It is now planned for 1984. Hence the evaluation team was requested ostensibly for the purpose of doing a mid-point assessment.

USAID's particular contribution to this commendable effort was the funding of 474 person months of academic and non-academic training in the U.S. and third countries and the funding of a consultant team to provide 192 person months of service. Among the original anticipated outputs of this consultant team effort specifically cited was "on-the-job training administered to NWSA central and branch office staff as deemed appropriate by the consulting team."

The responsibility for recruiting and screening individuals for AID-funded training rested with NWSA. Incredibly, at this time, only two individuals can be identified in training programs and the prospects of their graduating are dubious. Nobody has even started in the non-academic AID-funded training cycle.

AID also provided the resources for the so-called consulting team. It actually functioned as a group of individual specialists. All will be gone by the end of this year, but the contract has been amended to provide for the imminent and belated

appointment of a Training Adviser through the first quarter of 1982. Except in the financial area, the extent of on-the-job training provided by these advisors is not discernible. Even in that area, much more training is mandatory.

In other areas, NWSA has made significant and substantial progress. Although behind schedule, and still embroiled in contractual problems, the massive Sana'a II, Taiz, and Hodeida upgrading and expansion projects will be completed within two years. Tenders are being accepted now for the Ibb and Dhamar projects. Over 20 operational employees have been cycled through the Sana'a Vocational School, and another group is being assembled. A new utility accounting system now will begin to parallel the old government accounting system. The Central Planning Office computer has been accessed for the new accounting program, and a short term adviser, who started the utility electronic data processing system, will return to complete it with the data processing equipment just delivered to Yemen.

However, the managerial and technical expertise to replace consultant expatriates in the continuing management, operation, and maintenance of the new facilities coming on line was to have been a major output of the AID-funded program. Flatly, NWSA will need advisory and operational help for several years.

Some time has been lost. The difficulty of obtaining qualified MA candidates is now obvious. Some lowering of the academic target is indicated. Baccalaureate engineers perform effectively in many areas of water and wastewater systems design, construction, and operation, and assume their first position without any exaggerated sense of their capabilities.

There is still time and resources for a renewed AID-NWSA effort to fill the now virtually empty 028 Project Training Pipeline so that some very useful outputs will be obtained over the next five years. However, there is overriding urgency for fast-tracking the training of electrical, mechanical, and process hands-on specialists. The decisions must be made right now! They should be on the scene next year, not as full fledged "take charge" individuals--that will not happen--but as counterparts to expatriate hands-on specialists and as their eventual successors.

In short, since the AID academic and short-term fiscal and managerial training program never really got off the ground, many of the original resources are available. The original grandiose graduate program, even if revived, could not effect any improvements in NWSA during the next two critical years, as the new systems come on line. Some resources should be expended for baccalaureate work but only for discernibly promising individ-

uals. The center of gravity of the effort, however, should be the recruiting of individuals like master diesel mechanics, master electricians, machine shop foremen, who will both operate and train their already designated, and already present, Yemeni successors.

## Chapter 1

### INTRODUCTION

The Yemen Arab Republic (YAR) relies solely on groundwater for its water supply as there are no permanent sources of surface water. Some of the wadis have heavy flows during the summer, but none contains running water through the year. There are springs in and around Sana'a and Taiz, but they do not yield enough water to supply those cities nor can they be considered as permanent sources.

The Yemeni Government now plans to put a high priority on the development of its groundwater resources and in turn expects this activity to have an impact on the health and economy of the nation. Health standards are low throughout the country. The mortality rate for infants and pre-school-age children is said to be one of the highest in the world. Malnutrition, gastroenteritis, parasitic intestinal disease, especially ascariasis, are common. There are frequent outbreaks of cholera which is endemic in some areas.\* The primary causes of these conditions are the lack of an adequate supply of safe water and poor sanitation (waste disposal). To improve water supply and sanitation, the Yemen Arab Republic in November 1973 established the National Water and Sewerage Authority (NWSA). NWSA was charged with the responsibility for the planning, execution and operation of water supply and waste water disposal projects in selected urban cities. Although some progress was made during the years following the creation of NWSA there remained two critical factors that serve to constrain the proper development of this organization, namely, scarcity of skilled manpower and limited finances.

The United States Government recognizing these constraints, and wishing to help the YAR attain its goal in the water and sewerage sector, embarked on a bold, and rather ambitious program of assistance "to develop NWSA into an effective entity, capable of managing, planning, constructing and operating the urban water and sewerage systems." The proposed assistance was agreed upon and became known as USAID Project No. 279-0028.

The USAID Mission in Sana'a through the AID Office of Health in Washington requested the services of two senior consultants in water supply administration and manpower development to perform an evaluation of the project to date. These services were provided by the WASH Project under Order of Technical Direction (OTD) No. 39 (see Appendix A).

---

\*Personal-Interviews - USAID personnel.

The evaluation team of Martin Lang of Camp Dresser & McKee, Inc., and C.E. Calbert of International Science and Technology Institute conducted their assessment of the National Water and Sewerage Authority (NWSA) of the Yemen Arab Republic from June 3 to June 30, 1981 under the following general directive:

"The Water Supply Systems Management Project is designed to assist the National Water and Sewerage Authority (NWSA) to become an effective organization capable of planning, constructing, managing and operating urban water and sewerage systems as described in more detail in Annex 1 of the August 31, 1977 Grant Agreement between the Y.A.R.G. and A.I.D. The project will contribute toward this purpose by providing advisory services and academic and non-academic training to NWSA staff and personnel.

"The project evaluation will:

1. Evaluate progress towards attainment of project objectives and goal.
2. Recommend revision of project objectives and goal as appropriate, and recommend project modification/reduction as appropriate.
3. Identify and evaluate problems or conditions which may impede progress towards these objectives.
4. Assess what steps can be taken to overcome or minimize those problems."

Preliminary briefings on the findings, conclusions, and recommendations of the consulting team were presented in Sana'a on June 24 and 29, 1981 to:

Mohammed Ali Al-Fusail  
Director-General, NWSA

Mohammed A. Abu-Taleb  
Ass't Director General &  
Executive Director, NWSA

Charles Ward  
Mission Director, USAID/YEMEN

Zachary Hahn  
Capital Resources Development Officer  
USAID/YEMEN

F. LeYoung  
Project Officer, USAID/YEMEN

Dr. Bashati Ali  
Project Officer, USAID/YEMEN

## Chapter 2

### BACKGROUND

The seminal document on this project was written in late 1976 or early 1977 and bears re-reading today with the benefit of 20/20 hindsight. It is entitled "Project Assistance Paper - Yemen Water Supply Systems Management."

It is lucidly written and does indeed point out all the intricately interlocked assumptions of ideal performance by NWSA, consultants, and contractors that would lead to NWSA becoming a "fully staffed, effective entity, fulfilling EOP Status Criteria" by the end of FY 1983.

Despite its clarity of exposition, its yeasty optimism allowed no margin for the vicissitudes of real life, ignoring two predictable phenomena:

- (1) "Murphy's Law" applies in Yemen, as it does everywhere. Things will go wrong.
- (2) When things go wrong, any harried executive (in this case, the Director-General) will grab anybody to cope with the day-by-day "brush fires," and blithely ignore any long-range, or even short range, planning. He will do the urgent, and defer the important.

The writer of the Project Paper distilled its essence in one pregnant phrase: "Inasmuch as this project will focus primarily (emphasis added) on providing NWSA with a competent trained staff to carry out the responsibilities of a national utility...." Let us see how this intent was translated into contract documents.

On May 24, 1979, a contract was signed between the National Water and Sewerage Authority and Technical Management Services, Incorporated (TMSI). The effective date was June 15, 1979, and it was to terminate on September 15, 1981. It has been extended (for one individual) to August 1982. It initially provided for the following personnel for the time indicated:

Technical Planning Adviser	24 months
Financial Adviser (Headquarters)	24 months
Financial Adviser (Branches)	24 months
Administrative/Procurement Adviser	18 months
Maintenance Adviser (Civil Works/Pipeline)	18 months
Maintenance Adviser (Electro-Mechanical)	18 months

Note who is not there. The original Project Scope called for a Training Adviser "who would be charged with orchestrating all long- and short-term training needs within and outside of Yemen, institutionalizing such capability within NWSA, and assisting in curriculum development for vocational training programs. Duration 30 man-months." This is a precise description of an acute need today, yet NWSA dropped this from the proposal.

Now, let's look at the contract. In one paragraph, in general language is a reassuring echo of the project intent: "However as the primary objective of the technical advisory services is to provide NWSA with a long range plan and develop NWSA as an institution, the team will have the responsibility, working with and through the Director-General, to assure that team efforts are directed toward this goal."

This was never to happen. There was no "team." Another section of the contract reads as follows:

"The Consultant Team will not operate independently within the NWSA organization as a separate unit. Team members will be assigned to NWSA Operating Departments of Branches where they will have Department Heads and counterparts. Assignment of the team within NWSA will be under the direction and require the approval of the Director-General."

Furthermore, although the Technical/Planning Adviser is described in the contract as Technical/Planning Adviser (Team Leader), in fact, the contract then states the following: "As team leader for the administration of the contract, the Technical/Planning Adviser will not have direct supervisory control over other members of the team, nor will members of the team have a direct reporting responsibility to the team leader." In effect, each adviser is personally assigned and directed by the Director-General himself.

What were they to do? The so-called "Team Leader" would assemble monthly and quarterly reports. He would also "coordinate" the preparation of some 18 "special reports" ranging from a "comprehensive long-range development plan for NWSA" to "Operation and Maintenance Cost Data."

Each adviser had a long list of specific work tasks to perform under "duties and responsibilities" much like those required of in-house NWSA personnel. A significant responsibility was given to the Technical/Planning Advisor to "Advise and Assist the Director-General and Deputy Director General with operational, management, and planning problems on a day-to-day basis." The

Financial Adviser (Headquarters) was to "advise and assist the Head of the Financial Department with financial and accounting problems on a day-to-day basis." The Financial Adviser (Branches) was to do the same. The Administrative/Procurement Adviser was to "advise and assist the Head of the Administrative Department on procurement, personnel, communications and records and new house connection administration problems on a day-to-day basis."

The Operation and Maintenance Adviser (Civil Works/Pipelines) was also to "advise and assist the Head of the Technical Departments of each NWSA's branches with operations and maintenance and warehousing and control problems on a day-to-day basis. Very significantly, he was to "Develop and carry out in-country training for NWSA Operations and Maintenance and warehousing and control personnel as required." A dozen such training items are cited such as cleaning sewers and applying chlorine. Just tossed off, as item 12, is "Operating and controlling sewerage treatment facilities."

In effect, the contract, as contrasted with the Project Report, was structured by NWSA to provide separate specialists, each individually directly responsive to the Director-General, to be deployed as in-house operating and managerial personnel, for "day-by-day" needs. There is nothing wrong with filling the obvious need of NWSA for day-by-day response to urgent needs. It accurately reflected the Director-General's personal assessment of internal lack of capability. What it did do was relegate to an incidental, secondary goal the institutional development which the Project Report highlighted as the primary goal.

In fairness, the Director-General did believe that the day-by-day operational interaction of the Advisers with their nominal counterparts would, in effect, constitute a form of training.

However, a line-by-line review of 23 successive monthly reports shows that the Technical Adviser and the two maintenance advisers became the in-house engineering staff, heavily involved in design reviews and changes.

The TMSI personnel were delivering a useful service daily, a service that helped maintain the viability of NWSA, but largely not in accord with the original primary intent of the Project Report. It was substantially in accord with the contract, which only briefly refers to "in-country" training. That "in-country" training cited for the operation and maintenance adviser was not accomplished since his time was pre-empted by urgent assignments. Some of this shift in emphasis can be explained by the problems associated with the delays in completion of the new facilities.

The schedule of these projects, as of early 1981, is approximately:

	<u>Years Behind</u>
Sana'a Water I	2.0 yrs (completed)
Sana'a Water II	1.5 yrs
Sana'a Sewerage I	0.9 yrs
Sana'a Sewerage I	1.0 yrs
Taiz	0.5 yrs
Hodeida	3.0 yrs

The original project concept did not envisage the TMSI advisers grappling with many controversial construction details, but their doing so certainly served NWSA well.

In one area, financial management, TMSI made a reasonable start in accord with the original concept. Training was started on the creation of a utility financial accounting system to parallel the mandatory, but less precise, Government accounting system. It was officially started January 1, 1981. However, the short-term adviser on the electronic data processing input to this new computerized program left just as the equipment arrived. The hands-on accountants have never been effectively trained in this new concept and are therefore unable to implement the system. However, a new adviser is scheduled to arrive soon and it is hoped that training for the new financial accounting system will resume.

The conscientious and highly motivated TMSI "Team Leader," Thomas E. Bailey, doggedly persisted in attempting to fulfill his contractual obligation to produce the 18 "special reports." His frustrations are apparent despite the guarded language of his monthly and quarterly reports to NWSA. There developed a genuine difference of opinion between the Director-General of NWSA and the TMSI Advisers as to how much of the Adviser's time should be spent on the required special reports and long range institutional development and day-by-day trouble shooting.

The simmering controversy erupted in July 1980 when the Director-General sent letters to TMSI and individual advisers indicating his dissatisfaction with their work, asking them to document their daily activities, and particularly asking for the discharge of Branch Financial Adviser Ibrahim and Electro-Mechanical Maintenance Adviser Etienne.

In effect, NWSA informed TMSI that they required more immediate assistance and support in an operational mode rather than as advisers writing reports and developing concepts and procedures for long-term institutional developments.

A strict reading of the contract shows that the Director-General could properly demand this, but if he did not want the contractually obligated special reports he would have to amend the contract.

The President of TMSI came to Yemen to help resolve this dispute. Eventually, Etienne was eased out in an orderly manner over a period of six months. He was replaced, not by an engineer, but by a practical, skilled hands-on mechanic-electrician, Asbjorn Neillsen, working directly with a crew in Sana'a Branch on urgent repairs. Ibrahim was reprimanded, and retained.

The quarterly report for 1 October - 31 December, 1980 reads as follows:

"Following the significant change that took place last quarter in the concept of consulting services to be provided to NWSA under this contract, this quarter could be considered a period of down shifting. That is down shifting in the sense that the Advisers had to shift to a lower gear and provide monthly basic operational support and less high gear institutional development. The institutional development will necessarily have to follow the achievement of fundamental results to mitigate immediate problems faced by NWSA...."

The compromise approach, to straddle NWSA's perceived needs and the contract requirements, was expressed thus by TMSI:

"In essence, the approach will be to solve the immediate problems such as technical staffing needs at Sana'a Branch, customer accounts, warehousing, financial procedures and administrative procedures in a manner that will allow those solutions to be incorporated in the special reports required under the contract."

Perhaps in an ultimate "reductio ad absurdum" the Electro-Mechanical Adviser began to report his activities as follows:

"Supervised the drilling of a 3" hole in the roof...."  
"Assembled storage shelving"  
"Repaired toilet water closets"  
"Disassembled, cleaned, repaired and tested 4 hydraulic jacks"  
"Took wellfield water well meter readings"  
"Disassembled, cleaned, painted, and tested one chlorine scale," etc.

No fault should be imputed to either side. The Director-General could demand day-by-day response, in accord with the contract. TMSI put great weight on the "special reports" as influencing institutional changes. The "urgent-immediate" always prevails over the "long-term important."

Thomas E. Bailey leaves in September. The other three remaining advisers leave by the end of 1981. There is no desire on the part of NWSA to extend them.

This will leave a vacuum to be filled. These men, but mostly Bailey, serve as the in-house top engineering staff to the Director-General. In fact, they serve to generate the required responses to the donor organizations as well. The need for this service will expand in 1982, as the Taiz and Hodeida Projects are finally completed, tenders are evaluated for Ibb and Dhamar, and new contractual disputes inevitably surface.

Failure to fill at least one position as Technical Adviser would have a deleterious effect on NWSA's protecting its interests in design/construct matters and its credibility vis-a-vis the donors.

The Director-General has indicated no wish to extend TMSI services beyond the contracted dates, so this comment applies to a new recruitment.

There should be no regret and no recrimination from any of the parties involved, AID and NWSA, as the performance and outputs of the TMSI contract. By and large, they did exactly what was requested of them, certainly after spurring by the Director General in July 1980. They vigorously sought to discharge their contract obligations. The Director-General imposed increasing emphasis on daily urgent service. By delivering this service, TMSI contributed to the viability of NWSA, even if long-range institutional changes were relegated to the back burner. Thomas E. Bailey was a credit to U.S. engineering practice because of his sensitivity to what he perceived as the intent of the Project Assistance Paper as well as his adherence to the strict contract language.

The following four charts show the organization of the NWSA headquarters and the Hodeida, Sana'a, and Taiz branches.

NATIONAL WATER & SEWERAGE AUTHORITY

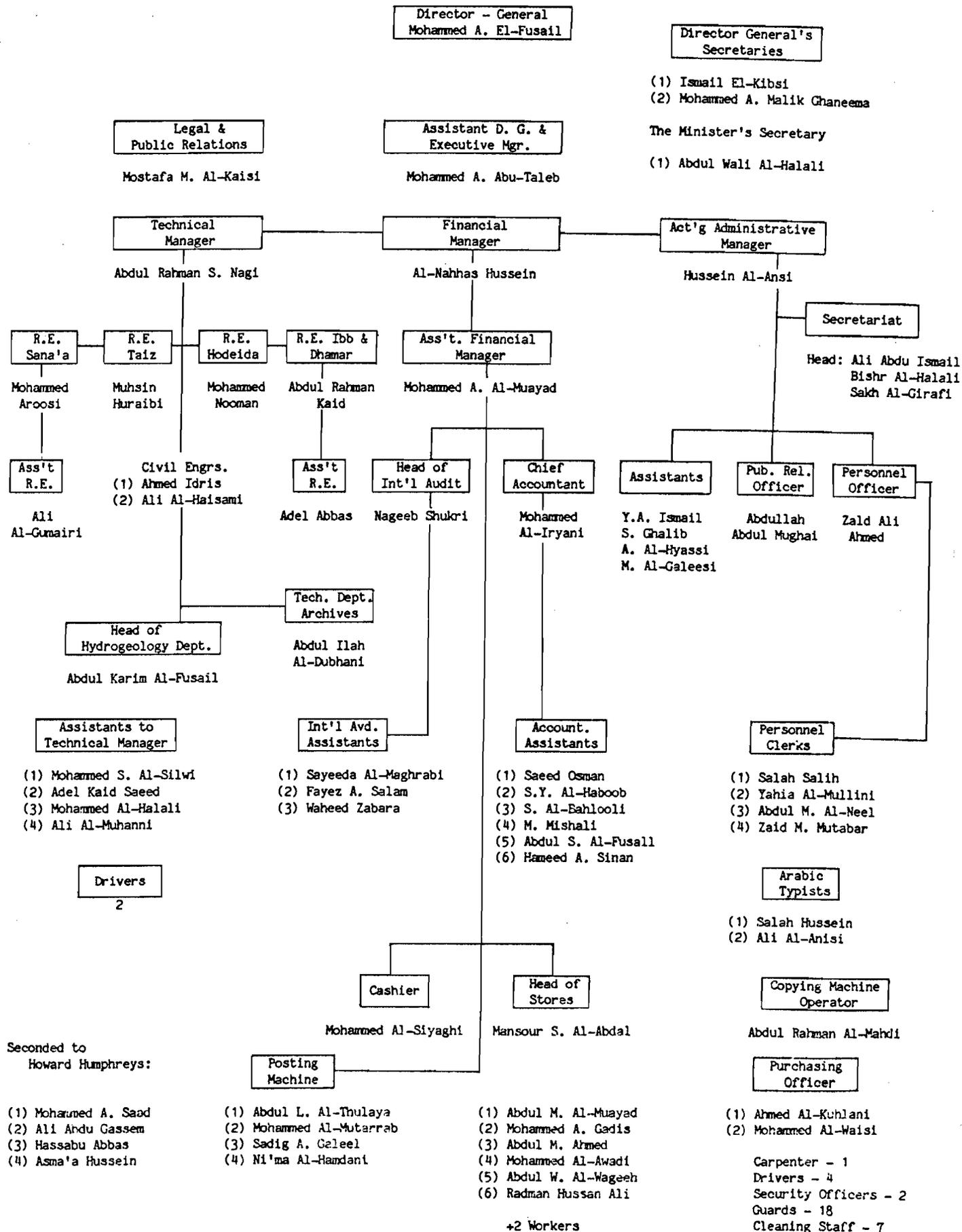


figure 2.

HODEIDA BRANCH ORGANIZATION

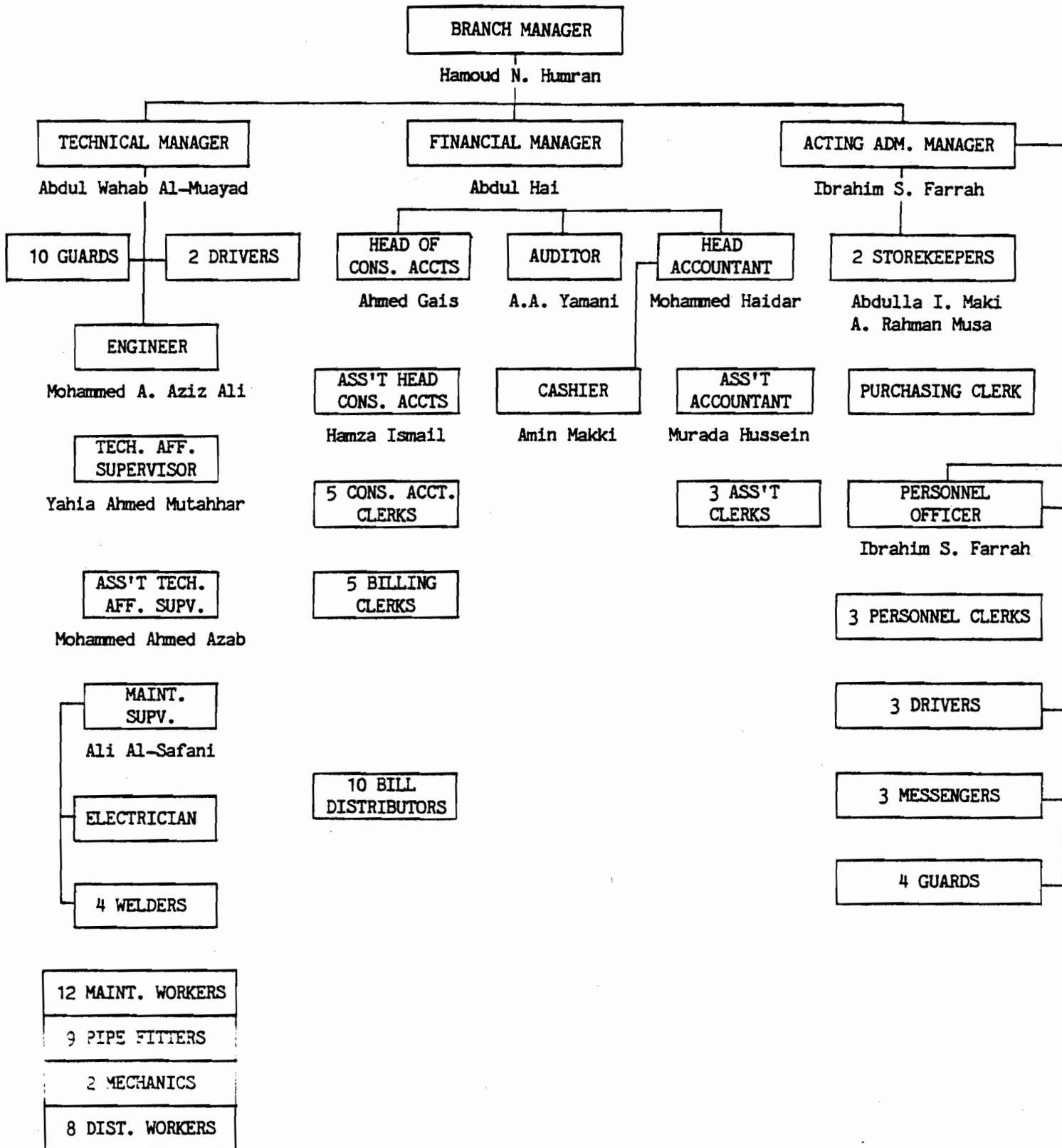


Figure 3.

SANA'A BRANCH ORGANIZATION

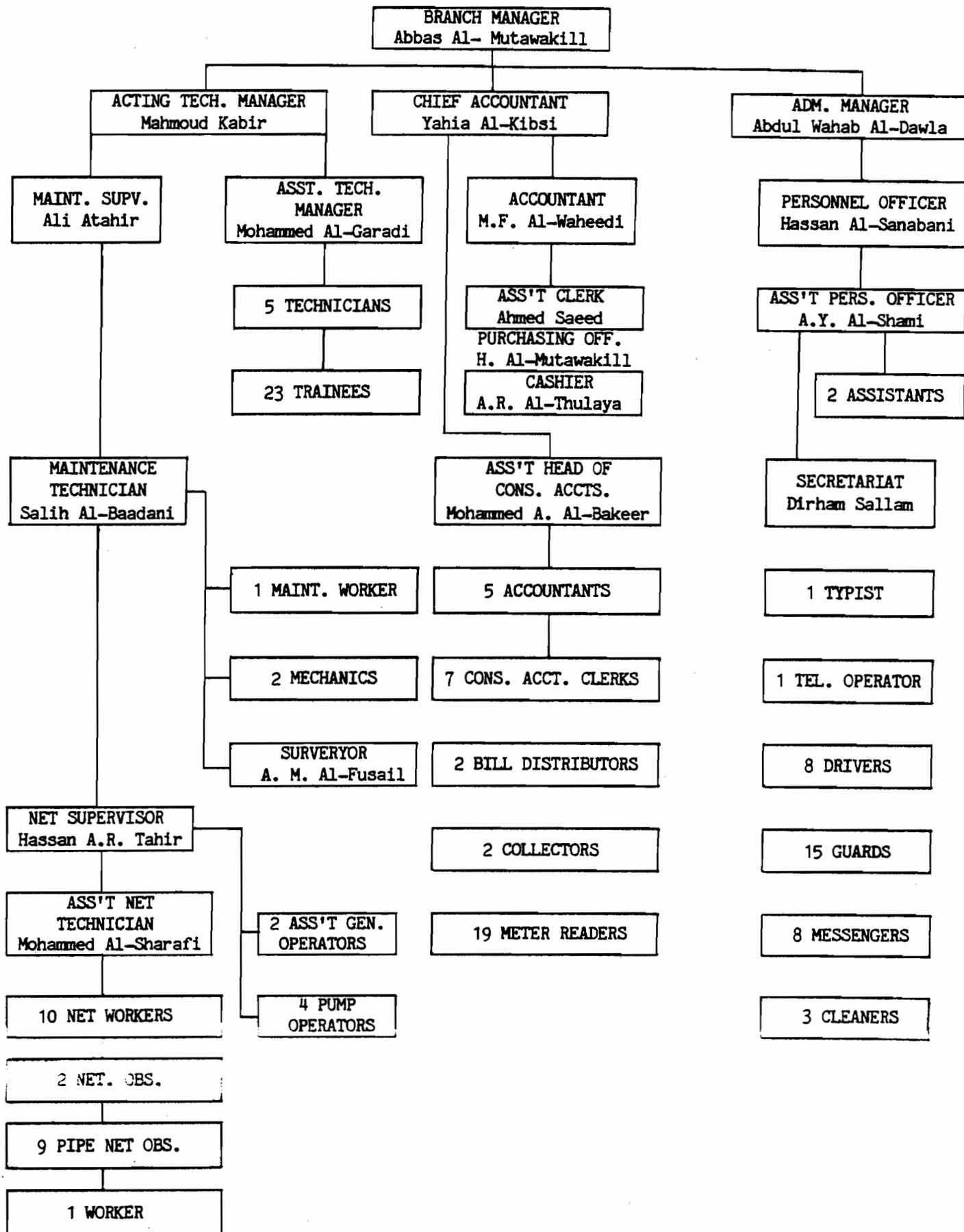


Figure 4.

TAIZ BRANCH ORGANIZATION

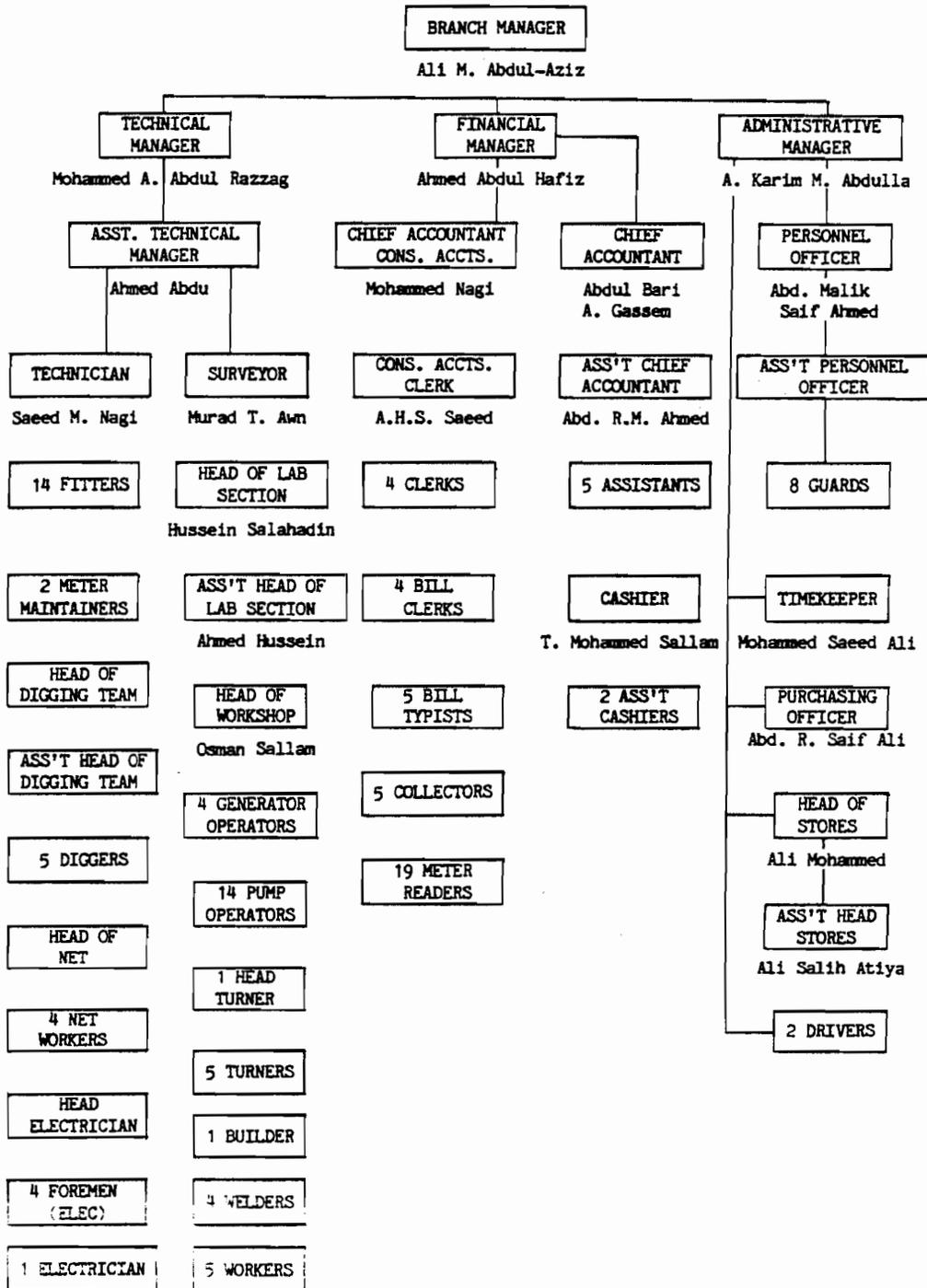


Figure 5.

## Chapter 3

### FIELD INVESTIGATIONS

#### 3.1 Sana'a Branch Evaluation

The Branch Manager, Mr. Abbas Al-Mutawakill, with the concurrence of his Acting Technical Manager, Mr. Mohmoud Kabir, his Chief Accountant, Mr. Yahia Al-Kibsi, and his Administrative Manager, Mr. Ahmed Al-Kebsi, made a desperate plea for hands-on help in all areas for several years. He hoped we could convey this convincingly in our report.

Typically, Mahmoud Kabir conceded he had nobody capable of making any complex internal electrical repairs. He wants expatriate hands-on assistance for "several years." He was reluctant to estimate precisely the time required. However, he was confident that he could produce Yemeni counterparts to profit from direct participation with expatriates as well as from specific training.

Typically, Yahia Al-Kibsi, Chief Accountant, felt that he had been thrown to the wolves by being required to depend on a computer program yet to be shaken down and by being required to implement the new utility accounting without adequate "in-branch" preparation. He refused to even estimate how long it would take for him to be master of his own enterprise until the new accounting procedure is in place.

It was illuminating to watch short-term Adviser Asbjorn Neillsen, a Danish Engineer, place and hook up a pump in a newly drilled well. He was using his own personal hand tools. He tightened every nut himself and spliced the power cable from the submersible pump to the control panel. He did a good job as master Mechanic, but no effort was made to train any Yemeni in any part of the day's activities. Since there was only one man and since getting the well on line was urgent, again short term needs prevailed.

Significantly, the pump for this well came from another well that ran dry. In the third quarter of 1980, a dramatic reduction was discovered in static ground water levels in Sana'a's western well fields. This was as much as 10 to 12 meters a year, instead of the two meters per year predicted in 1977. Some of these wells will suffice for less than 10 years.

There is no individual in the Sana'a Branch itself charged with the collection, analysis, and reporting of wellfield data, in-

cluding yield, drawdown, dissolved solids levels, and bacteriological quality.

The Sana'a water facility still does not pump 24 hours a day, and the water supply in the community is extremely unreliable.

In a searching interview with a pumping station foreman, who claimed 12 years residence and experience in Germany, it was found that he could only start and stop units, read instruments, and throttle valves. He had no one to repair switchgear, control panels, instruments, and rotating equipment.

### 3.2 Taiz Branch Evaluation

In a series of far ranging interviews with Branch Manager Ali M. Abdul-Aziz (graduate engineer) and Technical Manager Mohamed A. Abdul Razzag (graduate engineer), they concurred that:

- (1) They don't need Masters of Science or Arts.
- (2) Razzag himself admits he wants to get in the Master's program as a matter of prestige.
- (3) They want a combination of advisers and operators at all levels from middle management to foremen.
- (4) They feel no real training fell out from the presence of the Hazen & Sawyer consultants.
- (5) They are not prepared to run the new systems or to assure proper maintenance and process control.
- (6) The "old timers" who ran the old Taiz system since 1974 are disappearing, and they did not train successors.
- (7) They need help and it must be mobilized now to take advantage of the year's lead time they have before the new Taiz system is complete.
- (8) They concurred with our estimate that the mechanical and electrical equipment installation, shakedown, acceptance, and placing on line would require one year.

The Taiz yard contains, besides the Branch offices, a warehouse, generating station, some diesel direct driven pumps, and the newly built site for a booster pumping station, as well as storage tanks.

The generator station consists of three Fairbanks-Morse engines coupled to generators. There are two large engines and one small engine. They have plenty of spare parts, but this old array has never been checked by a master diesel mechanic. They know the cylinders have been long worn out of round, and they

can only deliver one-half of their rated output, running dirty and frequently with flaming exhaust. Yet this array is to handle the new main booster pumping station!

Apparently the much needed overhaul of these old units was proposed but inexplicably rejected. It merits the highest priority right now.

The existing set up of engines violates a fundamental operating concept. One should always anticipate a major unit's being down for a scheduled overhaul at the same time that another unit will break down.

In a searching interview with Mr. Buchanan, project engineer for Hazen & Sawyer (H&S) it was learned that Mr. Buchanan had assumed that the contractor was actually going to operate the plant during a one-year guarantee period. The contract was read to him and it was pointed out that there was just the normal one year gurantee on construction and equipment deficiencies.

It further developed that:

- (1) H&S had no specific contractual obligation to train.
- (2) H&S does have three NWSA engineers working with Buchanan on construction supervision. They have profited by this, but have not developed to the point where they could serve as in-house engineer in lieu of H&S.
- (3) It was pointed out that "the engineer" was to represent NWSA in any action on deficiencies during the guarantee period, but H&S would demobilize and be gone four months after substantial completion.
- (4) Buchanan, mistakenly, thought somebody was to prepare an operation and maintenance manual for Taiz. It is neither in the consultant's nor contractor's contract.
- (5) Buchanan assumed the services of the engineer could be extended another year or more. It is neither budgeted nor contracted.
- (6) He is absolutely certain that there is no local team available now for operation and maintenance, and that the one year's lead time to project completion should be devoted to this.
- (7) He is absolutely certain that some outside operator should take over on substantial completion and overlap with Branch counterparts.

In another interview, the NWSA Project Administrator, Ali Sebah Helaan, after he was compelled to read the specific contract language, agreed that it is mandatory to extend the services of the engineer to provide operation overlap and training to Yemeni counterparts.

There appears to have been a four-way breakdown in planning the operation of the new facilities among NWSA Headquarters, NWSA Taiz Branch, Hazen & Sawyer, and AID.

Inspections of the blow-off structures, lagoon excavations, grit chamber installation, control tower, and the sites for the new chlorinator and a new diesel generator station to power the new wellfields, revealed a lack of a planned staffing program and a communication network. (Curiously at a chlorinator station purported to be for one-ton cylinders, there appeared to be no cylinder handling crane or structural supports for one.)

In a long discussion with chief Accountant, Abdul Bari, he asserted:

- (1) They do indeed have a serious problem with the new utility financial accounting.
- (2) They absolutely need training in the branch, and they need Adviser Ziegler back to do it.
- (3) The Branch itself has sent four young women for "keyboarding training" (just typing) for two months to prepare them for electronic data processing keyboard training.
- (4) He could not estimate when they would be independent of an adviser.
- (5) They have had to hold the utility accounting in complete abeyance since the first of the year, just piling it up hopefully for eventual input.
- (6) The ancient billing machines are broken down, and they have been billing manually for the past two months.

The Taiz Branch is reputed to be the "model branch," and it appears to be that compared to Sana'a and Hodeida. Yet Taiz obviously needs a mix of direct operational and training help for at least the next two years.

### 3.3 Hodeida Branch Evaluation

Hamoud N. Humran, Branch Manager, really believed that the construction contractor was going to operate the facilities for one year after completion. After a quick review of the contract with Peter Rihlmann, Project Engineer for a German engineering consultant firm, Mr. Humran, was informed that one year, just

as in Taiz, was the normal guarantee period and he, himself, would have to operate the system.

By the next morning, Mr. Humran, after a wrap-up interview, was on his way to Mr. Rihlmann to ask for projected staffing of the new facilities.

In successive interviews over two days with Branch Manager Humran, Ibrahim S. Farrah, Personnel Officer, and Technical Manager Wahab Al-Muayud, they agreed:

- (1) They need counterpart training set up now for their new operational responsibilities in early 1982.
- (2) They hoped I would convey to NWSA the urgency of their training needs.

It was learned that all laboratory work had ceased in the NWSA, Hodeida branch, since 1979. They have some field kits, but they have not been used. They have not even been running chlorine residual. They do send samples, after problems develop, to the hospital or the local milk plant.

Mr. Abdul Hai, the Financial Manager and Acting Administrative Manager, also had his problems with the new utility accounting:

- (1) He now has to keep, manually, both the Government Accounts and the parallel utility accounts.
- (2) Mr. Ziegler sent a foreigner (Egyptian) to Sana'a for electronic data processing training.
- (3) Mr. Ibrahim, the TMSI Adviser, has been in Hodeida only three times for very short stays and always had to refer back to financial Adviser Worster. His total contribution was negligible.
- (4) He feels the new utility codes were just dumped on him to handle manually.
- (5) He does, indeed, already have on hand Yemeni candidates for electronic data processing training.
- (6) He can not predict the 'lead time' to independence from outside help, but estimates at least two years.

We inspected old and new wellfields, pumps, motors, control panels, the new control water tower, and two large Caterpillar diesel-generator emergency sets were inspected and Yahia Baba Salah, a tough and impressive foreman of pipe fitters, was interviewed.

Not surprisingly in interviewing the Chief Operator of the old wellfield, it was found that he had never been instructed on circuitry, instruments, and maintenance. He was willing, but untrained and uneducated. He did not know the function of the big oil-filled transformer at his station. He felt the high officials do not know or care about field problems. He certainly had received no instructions for the big new Caterpillar diesel sitting in his yard.

In exploring the role of the consultant engineer with the GITEC project Engineer, Mr. Rihlmann it was learned that:

- (1) They will finish in February 1982.
- (2) For the past year he had pointed out to NWSA the need for counterpart operation and training to last at least one year.
- (3) He has trained six NWSA engineers in construction practice.
- (4) He has employed 12 Yemeni technicians in his office and field operations. These could be part of an initial NWSA cadre.
- (5) He has recently proposed such operator training in writing to Hodeida Branch.
- (6) He feels this training is obviously needed as Hodeida is unprepared for the operation and maintenance of the new system.

Financial Status AID Project No. 279-0028  
As of 1st Quarter, 1981

LOP Funding:	
(Per Project Grant Agreement, August 31, 1977)	
(PACD: March 31, 1983)	\$5,000,000
Technical Assistance:	
1. TMSI Contract, including commodities	2,879,071
2. PIO/T Stanley Consultants	75,000
3. PIO/T (Cassano TDY)	2,600
4. PIP/T (3rd Country Training Adviser)	
Contract Amount \$99,000	
Disbursed	30,878
5. PIO/T (Haskins-Sells Taiz Tariff Study)	
Contract Amount \$124,000	
Disbursed	110,503
6. TMSI Contract Extension	<u>750,000</u>
Subtotal Technical Assistance	<u>\$3,848,052</u>
Available for Training	\$1,151,948

Table 1

AID Estimate of Remaining Resources

## Chapter 4

### EVALUATION OF THE TRAINING COMPONENT

#### 4.1 Purpose

The purpose of this part of the evaluation was threefold:

- "1. To assess the National Water and Sewerage Authority's (NWSA's) ability to recruit, train, and retain personnel.
- "2. Review NWSA's short- and long-term staffing and training plans and evaluate their reasonableness in terms of (a) requirements for Institutional Development; (b) existing financial, personnel and language limitations'; and (c) the mix among short and long term, degree and non-degree, and U.S./third country and on the job training.
- "3. Assess the effectiveness of project training to date for NWSA and for the participants. Determine and describe current status of training in NWSA including that funded by AID and cooperating donors and that provided by NWSA itself, e.g. on-the-job training."

#### 4.2 Evaluation Methodology

The primary methods used in this evaluation were:

1. A study of all project documents available in AID/Washington and USAID/Yemen, including the Project Assistance Paper, project implementation letters, the Technical Management Services, Inc. (TMSI) contract and TMSI's quarterly and monthly report. Other documents were made available by NWSA and TMSI which included a proposed training plan, staffing projections and organizational and capital development plans.
2. Personal interviews were conducted with NWSA's Headquarter personnel, TMSI technical adviser, AID project personnel and the administrators and technical staff at Sana'a Branch of NWSA.
3. Site visits were made to pumping stations, reservoirs and wellfields to gain some insight into

physical facilities as well as operational methods.

USAID assistance to be provided NWSA was to be in two areas from FY 1978 through FY 1983. In addition to the provision of a consultant team of technical and management advisers AID was also to provide long and short term training in the U.S. and in third countries.

The assumptions made by the project designers, were that, through recruitment, adequate training and retention of personnel an effective and viable organization could be built. This assumption is usually valid. But the time frame and scarcity of scientific and appropriate technical personnel in Yemen to recruit for training made this a highly theoretical concept. Nonetheless, it was a courageous undertaking.

The other assumption was that a training adviser would be available through TMSI to develop a long-term training program as well as to assist in establishing training centers for professional personnel in such areas as plumbing, welding, general mechanics, electricity, etc.

No training adviser was made available in the early part of the project. There was no real assessment of manpower needs and no viable training plan was developed. The early selection of participants appears to have been done in a rather random but perhaps expedient manner.

Finally, after a long period during which no training advisers were available to NWSA, one was selected and funded by USAID. The incumbent, Mr. N.K. Hussein, served only a few months before being released for reasons undetermined by the evaluators. Before terminating his employment, he submitted a plan in the form of a final report, which was not approved by several of the cooperating donors such as the World Bank and AID. Consequently no action was taken toward implementation of the plan. This document appears to have been in existence since April 1980.

Because of the critical need for a training adviser in the institutional development of NWSA a request was made by the TMSI Team Leader to have the TMSI/NWSA contract amended to provide for such a person. Subsequently on May 27, 1981, Amendment No. 1 was approved. Recruitment efforts have begun. Curriculae Vitae have been received and the selection of a candidate is now in process. It is quite possible the position will be filled in the very near future. Unfortunately the individual will arrive just a few months before the end of the TMSI contract and therefore may or may not be able to make much of a contribution to the program.

All of the above factors have had somewhat of an adverse affect on the implementation of the training program.

#### 4.3 Current Status of Training

##### 4.3.1 Inputs

Training inputs anticipated at the beginning of the project included long and short term training described as follows:

##### Academic (360 mm)

A two-year course of study in the United States leading to the masters degree for:

- 4 Sanitary Engineers
- 1 Electrical Engineer
- 1 Mechanical Engineer
- 1 Hydraulic Engineer
- 1 Business Administrator
- 1 Financial Manager

An estimated five-year course of study in a third country leading to the bachelors degree for:

- 1 Statistician
- 1 Economist

##### Non-Academic (114 mm)

Three Branch Chiefs and their assistants were to receive six months training of third country training in public utility management which would result in six trained persons.

Two plant treatment operators from each of the three branches were to receive one year's training in a third country resulting in six trained persons.

##### 4.3.2 Out-Puts

Twenty four persons were to have been provided training for a total of 474 person months under the 0028 project. Unfortunately the records indicate that only two persons have been sent for training and none has completed the course of study. There is supposed to be a third person studying for a degree in Emporia, Kansas, but no record of this student could be found.

The individuals who are actually in training are listed as follows:

1. Name: Ali Ahmed Al-Haisami  
Progress: Sanitary Engineer  
Duration: 28 man/months  
Arrival in USA: September 1, 1979  
Departure from USA: December 1981  
Training Site: American Language Institute  
Georgetown University  
Old Dominion University  
Norfolk, Virginia

The training program for Mr. Al-Haisami was designed to meet the following objective:

- (1) Provide him with English language training at Georgetown University.
- (2) Provide academic training leading to a masters degree in Civil Engineering.
- (3) Provide training in designing, constructing and managing urban water and sewerage systems.

Although Mr. Al-Haisama left for the United States in September 1979, the records at AID/Yemen show that he was admitted conditionally to Old Dominion University in January 1981. As far as can be determined the cause of this late registration was his deficiency in English. Since he apparently has been enrolled at the University only one semester, there are no reports of his progress. It is certain, however, that he will be unable to complete the 2-year course by his scheduled departure date of December 1981. There should be some follow-up on this individual by AID/Washington.

2. Name: Ahmed El-Sayed Idris  
Progress: Structural Engineering  
Duration: 28 man/months  
Arrival in USA: September 1, 1979  
Departure from USA: December 31, 1981

Idris' program was designed to meet the following objectives:

- (1) English language training at the American Language Institute, Georgetown University.
- (2) Academic training leading to a masters degree in civil engineering with emphasis on structural engineering.
- (3) Training in designing, constructing, and managing urban water and sewerage systems.

Records on file in AID/Yemen show that Mr. Idris' academic standing is marginal because of weakness in English and mathematics. The Chairman of the School of Engineering, in a letter dated May 7, 1981, suggests that if Mr. Idris fails to make satisfactory progress in English and mathematics he should terminate his attempt to do graduate studies in civil engineering at Old Dominion University.

3. Sahed Mohammed Othman, a financial analyst, is said to be studying in the United States During 1980-82. No records of his program were available to the evaluator.
4. Ahmed Al-Seaghy - Selected to study Sanitary Engineering at Pennsylvania State University was dropped from the program.

The above represents the extent of participant training funded by USAID under project 279-0028. Non-academic and third country training was not accomplished under this program even though funds were available.

#### 4.3.3 Inputs and Outputs from Other Cooperating Donors

British Council Scholarship Fund - provided a scholarship to Mr. Mohamed Said Al-Selivi to pursue a masters degree in hydro-geology at the University College in London. This is for a 16 month period which includes four months of English language training. The time frame was June 1980 to September 1981. Mr. Al-Selivi is now in London.

The Arab Fund - The Arab Fund has supported 11 individuals in a program at the Wad al Maghbul Institute in Sudan. The training was in land sciences including groundwater development. The program was of a three-year duration. Seven of these men have returned to Yemen and are now working in the NWSA program. In addition, seven men have been sent to a training program sponsored jointly by Somalia and Sudan. This program is for training of individuals who have completed secondary school. They will receive training in the operation and maintenance of plants, well stations, tanks, and pumping stations. The program is both theoretical and practical. The Arab Fund has supported two individuals from the NWSA finance section, one accountant and one auditor. This training was of one month duration in Cairo, Egypt. A total of 19 persons from the NWSA staff have received varied types of training under the Arab Fund.

World Bank - The World Bank has given a grant to Zahed Mutabad to study toward a B.S. degree in Civil Engineering in the United States. Mr. Mutabad's program began in September 1980 and should be completed in 1983. Another grant from the World Bank has been approved for Mr. Mohamed Mahdi who will also pursue a B.S. in Civil Engineering.

In-Country Training by NWSA - NWSA has embarked on a cyclical program in which it recruits individuals for training and subsequent employment. These individuals are trained as pipefitters, welders, electricians, vehicle maintenance men and surface explorers. The training is conducted at the German Vocational School, Sana'a. Twenty-four students have completed the two-year course. The numerical distribution of those trained is as follows:

- 16 pipe fitters, welders and water plant maintenance operators
- 4 electricians
- 1 vehicle maintenance man
- 3 surface explorers

Twenty-four students have been selected to enter this training in September 1981. This appears to be a good way to build an operating manpower staff.

Individuals successfully completing this training will continue to be employed by NWSA and distributed throughout the Branches.

Two Engineers from NWSA have received scholarships from the Dutch Government for a two-month period of study in Germany. One has already returned to Yemen.

#### 4.4 Evaluation of Outputs

The ambitious training programs envisaged by the project designers are failing dismally. Out of the 12 persons proposed for academic training (360 man months), only two can actually be considered in the pipeline, and their successful completion of their courses of study is rather dubious.

No non-academic nor third country training was started in the approximately three-year life of the program. This lack of achievement of the proper outputs in well-defined objectives is a disappointment, to say the least. The causes of such failure may have been the construction of the program without a realistic plan in mind. Moreover, it may have been that NWSA in its earlier stages of development was not prepared to release its

employees for out-of-country training for even a duration of six months. Then, frequently there are not enough nationals with minimum skills to accept such training. The evaluator was unable to assess this latter hypothesis during the limited time period.

This training program was designed in the traditional manner of most AID training programs for developing countries--that is to send promising individuals to universities in the U.S. and other countries to obtain higher degrees. This is time-consuming and expensive and has not always been a solution to the problem. The construction and operation of the water supply system has begun and not one trainee has returned to the job. Even if they had returned it is doubtful whether they would have sufficient practical experience to become top managers. Another factor to consider is that many students, once trained, tend to remain in the host country. Or students returning to their own country find their skills do not meet their countries' needs or they return to administrative rather than field positions which does not alleviate the shortage of trained managers and craftsmen.

The foregoing does not gainsay the fact that NWSA needed and still needs assistance in training and development of manpower, but any successful program must be properly planned. The training of manpower to staff programs in 1985 through 1995 or 2000 must begin now and not when all of the expanded facilities have been built and operating. The most important ingredient of successful training programs is intelligent front-end planning.

The USAID training program while not completely successful, has provided an impetus and has created an awareness within NWSA and among other cooperating donors that training is an important component of management and skills development. This support should not be discontinued, but revised to meet the real needs. These needs can only be determined by a valid assessment.

It was heartening to find that training programs are underway, both in-country and outside. Most of them, however, are supported by cooperating donors. It is regrettable that the USAID project has not fully complemented those of other donors. One of the key institutions is the Vocational Training Institute, where NWSA is sending their selected students. (The team did not become aware of the importance of this institute until the end of their stay, by which time it was too late to make a visit.) It is hoped there will be more of these kinds of institutions developed within the country.

The appointment of a training officer in NWSA and the amendment of TMSI contract which provides for a training adviser will likely alleviate many of the problems so prevalent in the manpower development programs in the past.

## Chapter 5

### SUMMARY

The National Water and Sewerage Authority is in a crucial year. Next year will mark the completion of the expanded and more sophisticated Taiz and Hodeida facilities, and probably the second stage of the Sana'a works. Next year will mark the start of construction at Ibb and Dhamar and will also signal the departure of existing consultants intimately involved with these projects and knowledgeable about them.

Decisions, long deferred, must be made now as to how to marshal and augment NWSA resources for 1982. A coherent NWSA training program must, at long last, be created and administered. The long term institutional growth of NWSA cannot be slighted, but there must be urgent "fast tracking" of all activities to support operation and maintenance of the new facilities. This is the cheapest insurance available to protect the enormous capital investment made by NWSA, the Arab Fund, the World Bank, AID and other donors.

There is a logical approach to accomplishing this. This approach should not be based on the erroneous assumption of unlimited resources in money, manpower, and time, nor should there be a slavish duplication of some elaborate foreign model. It should rather be an approach tailored to the existing structure of NWSA, and the government, geography, traditions and people of Yemen. Above all, it should not repeat the techniques which have failed in the past.

#### 5.1 General

1. At all levels of NWSA, there was complete and candid response to questions. No profound analysis was required to demonstrate that NWSA employees are eager to improve, do indeed welcome training, expatriate or otherwise, and are acutely conscious of any system deficiencies.
2. There was an important intent of the project, expressed in the Project Assistance Paper as follows: "... the primary objective of the technical advisory services is to provide NWSA with a long range plan and develop NWSA as an institution. The team will have the responsibility, working with and through the Director-General, to assure that team efforts are directed toward this goal." The team did indeed receive

close direction from the Director-General, but the overriding preoccupation with coping with day-by-day operation and technical urgencies precluded any effective pursuit of this major project intent.

3. Diligent inquiry could yield no health statistics. It is a reasonable assumption that the improvement in quality and quantity of potable water would be reflected in general health improvement. Such evidence would have been compelling justification of the project.
4. AID has assigned three successive staff members as liaison to this project in two years. The third person is just now being oriented to the project. At the same time, NWSA's communication with AID has been random and intermittent. This combination, regrettably, has deferred a free flow of feedback between NWSA and AID.

## 5.2 Branches

1. There is a clear and urgent need in all three NWSA branches for skilled personnel in the areas of electrical maintenance, mechanical maintenance, machine shop operation, diesel mechanics, pipe fitters, and even laboratory technicians. The men needed are at the foreman level, who will not only actually operate and maintain, but teach others. This need exists now to cope with the present Branch needs, and will be much more acute next year.
2. No branch has, at this time, a plan for the staff and skills required for its existing and future facilities, and a plan for action to recruit and retain such people.
3. No branch believes it is now prepared to undertake effective operation and maintenance of future facilities.
4. Each branch desires expatriate expertise for the initial operation and maintenance of the new facilities.
5. Each branch feels it can now supply most of the Yemeni counterparts for expatriate operator-trainers.
6. No branch has an office engineer charting and analyzing the performance of wellfields and predicting trends. Indeed, at Hodeida, no laboratory analyses have been made since 1979.
7. Neither the consulting engineers or the contractors were required to deliver an operating and maintenance Manual,

specifically written for the equipment and process at each.

8. In Taiz and in Hodeida the consultant engineer will be gone from the scene for most of the one-year maintenance guarantee period which starts at substantial completion.
9. In Taiz the consultant project engineer erroneously expected the contractor would supply one year of operation after completion.
10. In Hodeida the Branch Manager mistakenly assumed that the one year maintenance guarantee period would provide him contractual operation for one year.
11. In Hodeida the project engineer, Peter Rihlmann of GITEC, has trained six NWSA engineers and 12 technicians on construction procedures for eventual return to the Branch as a technical cadre for the new system.
12. In Sana'a Branch the expatriate short-term adviser, Asbjorn Nielsen, actually serves as hands on working master mechanic, both electrical and mechanical.
13. Sewage treatment lagoons are under construction at Taiz and Hodeida. Their operation can be more readily mastered than other types of wastewater treatment, but we could find no NWSA individual in these branches who had ever seen a lagoon in operation.
14. In Sana'a and Taiz, despite all efforts, there are still daily interruptions in water pumpage from the existing well fields.

### 5.3 Financial

1. The heralded beginning, on January 1, 1981, of the utility accounting system to parallel the conventional Yemen governmental accounting, is just that, a beginning. At this time, it has not yet been effectively implemented at any Branch.
2. Each Branch Financial manager and Chief Accountant had the same complaint--the lack of expatriate help right at the Branch to train Yemenis in keyboard techniques and then in data input by use of the newly delivered electronic data processing equipment. In fact, at Taiz at this time, everything, including billing, is done manually, with the archaic bookkeeping machines out of service. Branch estimates vary, but a general consensus was that from one to two

years would be required before routine utilization of the utility accounting.

#### 5.4 Administration

Administratively, the Branches are smaller replicas of NWSA Headquarters. That is, they are highly centralized. Petitioners and information seekers bypass the entire hierarchy and insist on seeing the boss. The only interviews that were not constantly interrupted by importunate individuals flourishing trivial documents were those held at remote wellfields in the countryside.

#### 5.5 NWSA General

1. The TMSI consultant advisers who have "de facto" served the Director-General as in-house engineers for design reviews and design changes will have left before the assumption by NWSA of the responsibilities for the new facilities and even before the completion of the critical testing acceptance of electrical and mechanical equipment.
2. The existence of massive new Branch systems should be no cause for complacency within the YAR. For example, the new Hodeida wellfields will suffice only to 1990. In effect, within a few years the feasibility, design, and construct cycle will start again. This is a compelling argument for NWSA to augment its in-house engineering and planning capability.

#### 5.6 Training

1. NWSA, with non-AID resources, has cycled 24 students through the two-year Sana'a German Vocational School, is assembling another class for entry in September 1981 entry and has, with Arab Fund support, put 11 men through a three-year land sciences course in the Sudan and, of these, has already sent seven men for practical operating experience in Somalia. In addition, NWSA moved promptly to nominate two men for World Bank scholarships for a BS in Civil Engineering.
2. The initiative for the exploitation of the AID funded training program rested with NWSA.
3. After two years, only two individuals can be identified in the AID funded academic program. Both of them are academically marginal.

4. After two years, NWSA has taken no action to exploit the non-academic training program offered by AID.
5. There does not now exist a NWSA training plan endorsed by the World Bank and/or AID.
6. There has been no activity for the past year to create a NWSA training program.

It cannot be over emphasized that the basic key to the continuity and viability of any organization is a core cadre of continuing career professionals, dedicated to their mission, and whose tenure will persist through successive reorganizations and administrative changes.

## Chapter 6

### CONCLUSIONS

If these findings are generally acceptable, certain conclusions inexorably flow from them.

- o NWSA is very much a viable organization. The government of the YAR cannot let it fail, since it involves the most vital life support system of the country, its urban water supply. It has quadrupled in seven years, so "growing pains" can be expected. Its Director-General is knowledgeable, tough, and opinionated. (The goals the Project Report set for NWSA by the "End of Project," 1983-84, should more realistically be extended to at least 1990.)
- o NWSA cannot adequately operate and maintain its physical facilities now and in the near future without a mix of various types of external aid.
- o The Contract Advisers (TMSI) did indeed serve largely as NWSA personnel rather than as "advisers" because when there are limited resources, immediately urgent need will always be addressed ahead of the long term important need even if it means using the resources earmarked for the long term important needs.
- o The original project report was on target in emphasizing the role of a training adviser to "orchestrate" the whole training program, academic and non-academic, funded by whatever sources, into one entity. The importance of this role, inexcusably neglected for a full year, is greater than ever.
- o For the same purpose, some party (probably AID) should aggressively take the initiative to somewhere, somehow, bring all parties together (AID, World Bank, Arab Fund) to integrate what is now a balkanized and fragmented approach to training. One opportunity would be a meeting for joint approval of a realistic overall training program.
- o NWSA now needs foreman-mechanics more than it does Masters of Science. NWSA could never have been catapulted into the ideal status envisaged by the Project Report by the infusion of six or even 16 Masters of Science each eager for a highly placed executive position. In Yemen, however difficult, a MS can be found

or created more readily than a top flight diesel mechanic willing to work and live in Hodeida.

- o Even if the Director-General, after a year of inaction, did attempt to fill the MS academic 028 pipeline, nothing could possibly result in time to help him start and run the facilities in the next two years.
- o It was grossly improper to start NWSA on a new accounting system and then, in the midst of the transition, permit the key adviser to pull out. With half the year already gone since the purported January 1st start, the time has come to face reality and postpone the effective date to January 1, 1982.
- o NWSA has to be an active partner, not just the passive recipient of services. One good way to demonstrate this would be to join hands with AID in setting and keeping a timetable for the nomination of candidates for training and a mutual screening and review of such candidates, particularly those being considered as Operator/Trainers.
- o The TMSI "team" did make some very specific contributions to NWSA. These were day-by-day services, such as in-house engineers should provide. They are now delivering their special reports as contractually required. However well written, they will probably just take their place on the Director-General's shelf.
- o The "in-country training," cited in the TMSI contract, did not take place, except in accounting, and much of that has yet to be finished.
- o NWSA can, and should, be helped by a one- or two-year infusion of mechanical and electrical specialists. Any long term benefit would be contingent upon their training their Yemeni successors.

## Chapter 7

### RECOMMENDATIONS

- o Take a deep breath and be reconciled to the fact that NWSA will not be transformed in a few years into an austere staffed, highly productive, and highly profitable utility.
- o An adequate supply of competently trained manpower is vital to the accomplishment of NWSA's objective to supply adequate and safe water supply and proper waste water disposal to the population of Yemen. In this connection, and with a view towards the goals of the Government of Yemen, it is recommended that immediate steps be taken to set up a manpower development and training program on a long term basis to make necessary studies and projections in order that major objectives be accomplished.
- o NWSA has created a position of Training Officer in its Headquarters. It has been filled for approximately seven months. The Training Adviser, to be supplied through the TMSI contract should work closely with NWSA's training officer to build a strong section or branch to carry out a training program. Further, this section or branch must have an adequate staff with the required leadership and the technical and management competency to implement this program on a self-reliant basis.
- o Get a competent, experienced resident training adviser. Interview him thoroughly in the United States before selection. Forget the suggested fussy improvisation of some "expert" adviser who visits intermittently. Insist that, as a prerequisite, a formal full-time counterpart NWSA Training Officer be designated. It is necessary for all which follows.
- o A clearly visible manpower development and training program, with authority and functional responsibilities adequate to realize its goals is essential to the National Water and Sewerage Authority and its component parts. The strength of the activities will depend upon its placement and support in the framework of the total organization. The manpower and training activity cannot function unless it has strong and formal endorsement by the Director-General of NWSA. Further,

the role of the Manpower and Training Section must be unambiguous. The functions of the section should not be subordinated to a role which is weak and wholly dependent for influence on the compatibility of the personalities involved. The extent of current and future needs in the manpower and training area certainly warrants much greater attention than has been recognized in the past or that appears to be proposed in any future organizational plan.

o As an attempt to put forth some concepts which may assist NWSA in the development of a viable manpower program and to enhance the progress of the water supply and sewerage program, the following recommendations are offered regarding its training program:

1. Establish a strong focal point for manpower development and training at a high level within NWSA.
2. Establish the policies necessary to accomplish the intramural and extramural development mission and goals.
3. Develop and implement a manpower intelligence system that will pinpoint current needs and serve as a basis for long range projections of manpower supply and demand.
4. Develop and maintain effective liaison with other government and private agencies that are concerned about technical and scientific manpower.
5. Cooperate with other government and private agencies in conducting, supporting and promoting research on problems of manpower, recruitment, training and utilization in the scientific and technical field.
6. Establish assured career development plans for professional and technical manpower.
7. Develop interrelationships in Yemen among educational institutions which will facilitate the training, retraining, or utilization of sub-professional manpower.

- o It is recommended that, on a crash basis, with joint instructions from NWSA and AID, the Training Officer and the Training Adviser prepare a short-term operation and training plan for each of the three branches for the next two years. This will involve at least two "blue collar" operator/trainers for each branch for electrical and mechanical maintenance and process operation. This will involve the definite designation of the most qualified Yemeni counterparts available throughout NWSA, including those serving with the Hodeida GITEC consultant. (The continuation of the services of Asbjorn Nielsen would be a good first step.)
- o Make every attempt to have the Arab Fund and World Bank join with AID in the review and approval of this critical short term plan which will protect their investment. They might just want to contribute. This short term plan is the first phase of an overall long term plan.
- o Advertise widely for Operator/Trainers, and even if it means sending representatives from NWSA and AID/Yemen to Washington, interview candidates in the U.S. The goal is to have them on site by the first quarter of 1982.
- o When the short-term plan is mounted then the Training Officer/Training Adviser unit should embark on the long-term training plan. They should receive joint instructions by NWSA and AID to:
  1. Revive the academic training on a modest scale, reduced to two or three baccalaureates in engineering, including one electrical engineer.
  2. Rework the non-academic training for those specifically assigned to foreman level in the Branches.
  3. NWSA and AID should jointly screen and approve all candidates through the Training Officer and the Training Adviser.
- o Fill the biggest gap that will be left when the TMSI team leaves--that of a competent engineer for in-house review of tenders, designs, proposed design changes, proposed construction changes and preparation of reports to donor agencies. This need not be an extension

of contract, but could be the recruitment of a specific individual.

- o Change the effective date for the utility accounting to January 1, 1982, and thus allow decent interval for training.
- o A "long-term important" need can now be addressed. Because Sana'a may just be "mining out" its potable water, there is a need for the continuing assessment of entire aquifers, as well as individual wellfields, for such criteria as safe yield, extent of drawdown, and increase in dissolved solids. This can be started by one consultant, and continued in-house thereafter.
- o Mount some overlooked remedial action at Taiz by expert overhaul of the three twenty-year old engine-generator sets which have not been seen by a Master Diesel Mechanic in recent years, if ever. They will be required to power the new booster pumps.
- o Set up a rudimentary field laboratory in Hodeida, using "test kits," for at least chlorine residual control and total solids monitoring.

APPENDIX A

Water and Sanitation for Health (WASH) Project  
Order of Technical Direction (OTD) No. 39

May 5, 1981

TO: Mr. James Arbuthnot, P.E.  
AID WASH Contract Project Director

FROM: Mr. Victor W.R. Wehman, Jr., P.E., R.S. *VWW*  
AID WASH Project Manager

SUBJECT: Provision of Technical Assistance Under WASH Project Scope of  
Work to USAID/Yemen (Water Supply Systems Management 279-0028)

REFS: A) SANAA 2163, B) STATE 089706, C) SANAA 2555, D) P.IO/T 279-0028-  
398118, E) STATE 102592, F), SANAA 1800, G) SANAA 1959

1. WASH contractor/subcontractor/consultants requested to provide two senior water supply specialists to assist USAID/Yemen in an independent outside field evaluation of subject project.

2. WASH contractor/subcontractor/consultants authorized to expend up to 40 persons days, each, for 2 individuals during the period May-July 1981 with a total level of effort authorized of 80 days.

The evaluation will be conducted by a team consisting of a senior water and sewerage authority advisor with experience in water and sewerage operations and administration, preferably in developing countries, and a training/personnel advisor also with water and sewerage experience. It is estimated that the above scope of work requires four weeks of senior water and sewerage authority specialist and two weeks of the training/personnel specialist in Yemen and one additional week each in the U.S.A. for preparation of the final evaluation reports for a total of eight persons weeks. The senior water and sewer authority specialist will be the team leader.

Up to a total of 60 person days of international per diem authorized.

Up to a total of 20 person days of domestic per diem authorized.

3. Consultant tasks include (subject to modification by mission with concurrence from AID WASH Project Manager) an evaluation of the subject project.

The project evaluation will include the following:

- A. Evaluation of progress towards attainment of project objectives and goal.
- B. Recommended revision of project objectives and goal as appropriate and recommended project modifications/reductions if appropriate.
- C. Identification and evaluation of problems of conditions which may impede progress towards those objectives.
- D. Assessment of steps that can be taken to overcome or minimize those problems.

4. In conducting the project evaluation, the consultant specifically shall include the following:

A. Review of all project documentation including the Project Paper, Project Grant Agreement, Project Implementation Letters, the Technical Management Services, Inc. (TMSI) contract and TMSI's periodic and monthly reports. The team will spend one to two days in AID/W prior to travel to Yemen to review documentaiton and hold background discussions with relevant project personnel.

B. To the extent possible, identification and quantification of project progress to date, e.g. person-months of technical assistance provided, person-months of training received, project equipment procured, and contract reports prepared by TMSI, etc.

C. Description of NWSA's functons and process and recommendation of improvements in its:

- (1) Ability to function effectively without outside technical assistance.
- (2) Ability to obtain and utilize data, to make and carry out decisions based on such data.
- (3) Ability to procure and maintain equipment.
- (4) Overall ability to plan, construct, manage and operate urban water and sewerage systems. Determine the project's role in these functions.

5. Assessment of project work plans and contractor scope of work to determine:

- a) Whether type and quantity of project inputs are appropriate and can reasonably achieve project objectives and goal.
- b) Whether sequence and priority of inputs are reasonable. Support any recommended modifications.

6. Asséssment of NWSA's ability to recruit, train and retain personnel.

7. Review of NWSA's short and long-term staffing and training plans and evaluation of their reasonableness in terms of: a) Requirements for institutional development; b) existing financial, personnel and language limitations; and c) the mix among short and long-term, degree and non-degree, and U.S./third country and on-the-job training. Support any recommended modifications.

8. Assessment of the effectiveness of project training to date, for NWSA and for the participants.

9. Description of the extent to which technical assistance advisors are serving as surrogate NWSA staff rather than as advisors. Assessment how this effects project purposes. Recommendation of how current technical assistance might be made more effective.

10. Additional recommendations as might promote progress towards achievement of project objectives and goal, including supporting rationale.

11. The two-member team will make an oral presentation and submit an outlined report, with preliminary conclusions and recommendations to NWSA and USAID prior to departure from Yemen. Within 30 days of receipt of comments from NWSA and USAID, the contractor will submit five copies of its final report in English to NWSA and five copies to USAID.

12. One round trip authorized for each consultant from consultant's home base to WASH headquarters to Sanaa and return through Washington to home base. In-country travel authorized if not available through mission. Vehicle rental chauffeur hire is authorized as necessary under Scope of Work. Local hire of translators, sociologist, typist, draftsmen, and cost estimators is authorized to \$2,000.

13. Seven-day work-week is authorized if necessary and appropriate and certified as necessary by project team leader. (Note: Consultant will be paid only for days actually worked).

14. WASH contractor will bring consultants in for a 2-day briefing in WASH before they go to Yemen. Contractor to ensure that NE Bureau and DS/HEA briefings are provided for consultants.

15. WASH contractor will hold formal debriefing upon return from field.

16. Ensure AID/Yemen desk officer and NE/PD (P. Holmes) are fully coordinated with and informed throughout this effort.

17. Mission and desk officers should be contacted immediately and technical assistance initiated as soon as possible or convenient to missions

18. Appreciate your prompt attention to this matter. Good luck.

VWW/ja/5/5/81

PAGE 01  
ACTION AID-35

SANAA 02163 310852Z

8527 045290 AID6444

-----  
ACTION OFFICE NENA-03  
INFO NEPD-04 NEDP-02 NETC-04 NEJL-03 PPCE-01 PDPR-01 PPPB-03  
PPEA-01 STA-10 CMGT-02 CTR-02 CH8-01 RELO-01 MAST-01  
/039 A1 401  
-----

INFO OCT-01 /036 W

-----322577 310852Z /34

R 310645Z MAR 81  
FM AMEMBASSY SANAA  
TO SECSTATE WASHDC 6821

UNCLAS SANAA 2163

AIDAC

E. O. 12065: NA  
SUBJ: PROJECTS 279-0043 AND 279-0028 EVALUATIONS

REF: (A) AMMAN 02286 (B) SANAA 1959

1. CONSIDERING NONAVAILABILITY OF DAJANI PER REF A, USAID RECOMMENDS DR. RONALD E. BLOOD OF UNIVERSITY OF NEW MEXICO, ALBUQUERQUE, OR DR. MAHMOOD H. BUTT OF ROCKFORD COLLEGE, ROCKFORD, ILLINOIS, AS POSSIBLE TRAINING/PERSONNEL SPECIALIST FOR SUBJECT EVALUATION.

2. RE PARA 1 REF B, COPIES OF SUBJECT PIO/TPBRLSO BEING HANDCARRIED BY JOHN LAMB, AID CONTRACTOR (CHEMONICS INTERNATIONAL, PHONE: (202) 466-5340), ARRIVING WASHINGTON O/A 4/3/81. PLEASE COORDINATE PICK-UP FROM CHEMONICS.

LANE

UNCLASSIFIED

Department of State

OUTGOING  
TELEGRAMPAGE 01 STATE 089706  
ORIGIN AID-35

9970 051834 AID1984

-----  
ORIGIN OFFICE NEPD-04  
INFO NETC-04 NENA-03 AADS-01 CMGT-02 CTR-02 DSHE-01 RELO-03  
7C-00 /018 AD  
-----

INFO OCT-00 /035 R

DRAFTED BY AID/NE/PD: PHOLMES  
APPROVED BY AID/NE/PD: RHBELL  
AID/DS/HEA: VWEHMAN (PHONE)  
AID/CM/ROD/NE: JPITTINGER (SUBS)  
AID/NE/NENA: CCROWLEY (PHONE)  
AID/NE/PD/NENA: JWILLIAMS

Wch

-----225123 092206Z /34

P 091636Z APR 81  
FM SECSTATE WASHDC  
TO AMEMBASSY SANAA PRIORITYUNCLAS STATE 089706

AIDAC

E. O. 12065: N/A

TAGS:

SUBJECT: PROJECT 279-0028 WATER SUPPLY SYSTEMS MGT. - MID  
PROJECT EVALUATION..

REF.: SANAA 2163

1. REGRET NONAVAILABILITY OF DAJANI. SEVERAL CANDIDATES FOR BOTH SENIOR WATER AND SEWERAGE AUTHORITY CONSULTANT AND TRAINING/PERSONNEL SPECIALIST HAVE BEEN IDENTIFIED THROUGH (WASH) PROJECT. COMPLETE RESUMES BEING HAND CARRIED TO SANAA BY MISSION DIRECTOR.

2. INFORMAL REVIEW BY AID/W PROJECT COMMITTEE RANKED CANDIDATES AS FOLLOWS: WATER AND SEWERAGE CONSULTANT-SHIP-MAN, PINEO AND OKUN; TRAINING/PERSONNEL CONSULTANT - CALBERT OKUN RAPPOLD AND HAFFNER. HAVE REQUESTED RESUMES FROM DRS. BLOOD AND BUTT SUGGESTED REFTEL. PLEASE ADVISE FINAL USAID RECOMMENDATION FOR TEAM COMPOSITION BASED UPON REVIEW OF RESUMES AND MORE COMPLETE KNOWLEDGE OF EVALUATION REQUIREMENTS.

3. UPON RECEIPT OF USAID RECOMMENDATION WE WILL SEEK TO CONTRACT FOR SERVICES ON BASIS OF RANKING AND AVAILABILITY. NOTE IF WE GO WASH ROUTE FOR BOTH ADVISORS, ALL SERVICES

WOULD BE CENTRALLY (RATHER THAN PROJECT/PIO/T) FUNDED AND SHOULD BE AVAILABLE O/A MAY 1. IF USAID SHOULD OPT FOR DRS. BLOOD OR BUTT, THEIR SERVICES WOULD BE OBTAINED VIA PIO/T FUNDED PERSONAL SERVICES CONTRACT. PLEASE ADVISE. CLARK

UNCLASSIFIED

PAGE 01  
ACTION AID-35

SANAA 02555 151312Z

-----  
ACTION OFFICE NEPD-04  
INFO NEDP-02 NETC-04 NENA-03 PPCE-01 PDPR-01 PPPB-03 PPEA-01  
STA-10 AADS-01 CMGT-02 CTR-02 DSHE-01 CH8-01 RELO-01  
MAST-01 /038 A4 815  
-----

INFO OCT-01 /036 W

-----371147 151312Z /34

R 151219Z APR 81  
FM AMEMBASSY SANAA  
TO SECSTATE WASHDC 7022

UNCLAS SANAA 2555

AIDAC

E. O. 12065: NA  
SUBJ: EVALUATIONS OF PROJECTS 279-0028 (WATER SUPPLY SYSTEMS MANAGE-  
MENT AND 279-0043 (WATER RESOURCES PANNING AND MANAGEMENT)

REF: (A) STATE 089706 (B) SANAA 1959

1. RE PARAS 1 AND 2 REFTEL A, USAID HAS REVIEWED RESUMES OF CANDIDATES FOR BOTH SENIOR WATER AND SEWERAGE AUTHORITY CONSULTANT AND TRAINING/PERSONNEL SPECIALISTS. USAID RECOMMENDS SHIPMAN FOR SENIOR WATER AND SEWERAGE AUTHORITY CONSULTANT AND BLOOD, CALBERT, AND BUTT (IN THIS ORDER OF PREFERENCE) FOR TRAINING/PERSONNEL SPECIALIST SLOT. DR. BLOOD, WHO IS WELL KNOWN TO USAID HAS VAST KNOWLEDGE AND EXPERIENCE IN ALL RELEVANT AREAS OF EDUCATION, TRAINING, ADMINISTRATION, PERSONNEL, AND EVALUATION AND, THEREFORE, WE FEEL IS BEST QUALIFIED FOR THE JOB.

2. RE PARA 2 REF B, USAID STILL STRONGLY PREFERS DR. WALTER MOORE FOR PROJECT 0043 EVALUATION AS SENIOR MANAGEMENT HYDROLOGIST. IF BLOOD AND MOORE ARE AVAILABLE, USAID IS IN AGREEMENT TO FUND THEIR PERSONAL SERVICES VIA PIO/T AS ALLUDED TO IN PARA 3 REF A.

3. IN ORDER TO FACILITATE AVAILABILITY OR SHIPMAN, BLOOD, AND MOORE USAID IS WILLING TO DELAY START OF SUBJECT AVALUATION TO O/A MAY 15.  
LANE

40141

1980-1 PROJECT	DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT	1. Cooperating Country Yemen Arab Republic	Page 1 of 1
	PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES	2. PJO/T No. 279-0028 3-9311E	3. Original or Amendment No.
		4. Project/Activity No. and Title 279-0028 Water Supply Systems Management	

DISTRIBUTION  AID/W 15 GC 2 DESK 1 CPO 1 CONT 2 PROG 2 EEO 2 OCD 10	5. Appropriation Symbol 72-1191021	6. Allotment Symbol and Change 948-50-279-00-69-13
	7. Obligation Status <input type="checkbox"/> Administrative Reservation <input checked="" type="checkbox"/> Implementing Document	8. Project Assignment Completion Date (Mo., Day, Yr.) March 31, 1983
	9. Authorized Agent AID/W	10. This PJO/T is in full conformance with PJO/T Grant Agreement Date 8/31/77
	11a. Type of Action and Governing AID Handbook <input type="checkbox"/> AID Contract (HS 14) <input type="checkbox"/> FASA/RSSA (HS 12) <input checked="" type="checkbox"/> AID Grant (HS 13) <input type="checkbox"/> Other	11b. Contract/Grant/FASA/RSSA Reference Number (if this is an Amendment) N/A

NE/WE/NA  
Christy and Lucey  
NE/WE/NA

12. Estimate Financing (A detailed budget in support of column (2) is attached as attachment no. _____)				
	(1) Previous Total	(2) Increase	(3) Decrease	(4) Total to Date
A. Dollars		\$30,000		\$30,000
B. U.S.-Owned Local Currency				

13. Mission References
- 1. Pro-Ag dated 8/31/1977
  - USAID letter to NWSA dated 1/14/81
  - 3. State cable 032877

14a. Instructions to Authorized Agent

Negotiate a work order for the services of a senior water and sewerage authority consultant and a training/personnel specialist to conduct an independent, in-depth, outside field evaluation as described in Attachment No. 1.

It is desirable for the services to commence on or after May 1, 1981.

14b. Address of Voucher Paying Office

USAID CONTROLLER, SANAA, Y.A.R.

15. Clearances—include typed name, office symbol, telephone number and date for all clearances.

A. The project officer certifies that the specifications in the statement of work are technically adequate CD:BA11	Phone No. Date 2/28/81	B. The statement of work lies within the purview of the initiating and approved agency program PROG:HJohnson	Date 2/28/81
C. EXO:TBertotti	Date 3/2/81	D. Funds for the services requested are available CONT:KSBurford	
E. D/DIR:KWBeckman	Date 7 Mar 81		

16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to	17. For the Agency for International Development
Signature Mohammed Ali al-Fusail	Signature Charles J. Ward
Date	Date 3/7/81
Title Director General, NWSA	Title USAID, Director

1. Cooperating Country  
Yemen Arab Republic

2. PIOT No.  
279-0020-3-9013

Page 4 of 6

4. Project/Activity No. and Title

279-0020 Water Supply Systems Management

SCOPE OF WORK

19. THE SCOPE OF TECHNICAL SERVICES REQUIRED FOR THIS PROJECT ARE DESCRIBED IN ATTACHMENT NUMBER 1 HERETO ENTITLED "STATEMENT OF WORK".

Attachment No. 1

18. SPECIAL PROVISIONS

- A.  LANGUAGE REQUIREMENTS (SPECIFY) Not Applicable  
(IF MARKED, TESTING MUST BE ACCOMPLISHED BY AID TO ASSURE DESIRED LEVEL OF PROFICIENCY)
- B.  ACCESS TO CLASSIFIED INFORMATION  WILL  WILL NOT BE REQUIRED BY TECHNICIANS.
- C.  DUTY POST(S) AND DURATION OF TECHNICIAN SERVICES AT POST(S) (IDENTIFY) Sanaa and  
Other areas of Y.A.R. as required - four weeks
- D.  DEPENDENTS  WILL  WILL NOT BE PERMITTED TO ACCOMPANY TECHNICIAN.
- E.  WAIVER(S) HAVE BEEN APPROVED TO ALLOW THE PURCHASE OF THE FOLLOWING ITEM(S) (COPY OF APPROVED WAIVER IS ATTACHED) N.A.
- F.  COOPERATING COUNTRY ACCEPTANCE OF THIS PROJECT (APPLICABLE TO AID/PI PROJECTS ONLY)  
 HAS BEEN OBTAINED  HAS NOT BEEN OBTAINED  
 IS NOT APPLICABLE TO SERVICES REQUIRED BY PIOT
- G.  OTHER (SPECIFY):

20. BACKGROUND INFORMATION (ADDITIONAL INFORMATION USEFUL TO AUTHORIZED AGENCIES)

Please see Attachment No. 1.

21. SUMMARY OF ATTACHMENTS ACCOMPANY THE PIOT (INDICATE ATTACHMENT NUMBER IN BLANKS)

- 2 DETAILED BUDGET IN SUPPORT OF INCREASED FUNDING (BLOCK 12)
- \_\_\_\_\_ EVALUATION CRITERIA FOR COMPETITIVE PROCUREMENT (BLOCK 14)
- \_\_\_\_\_ JUSTIFICATION FOR NON-COMPETITIVE PROCUREMENT (BLOCK 14)
- 1 STATEMENT OF WORK (BLOCK 13)
- \_\_\_\_\_ WAIVER(S) (BLOCK 18) (SPECIFY NUMBER)

Cooperating Country  
**Yemen Arab Republic**

REPORT No.  
**279-0028-3-90118**

Page 2 of 6

Project/Activity No. and Title

**279-0028 Water Supply Systems Management**

**22. Relationship of Contractor or Participating Agency to Cooperating Country and to AID**

A. Relationships and Responsibilities: The team will report to the Director General, National Water and Sewerage Authority, Y.A.R., the team will also work in close consultation with USAID/Sanaa.

B. Cooperating Country Liaison Official: Mr. Mohammed Ali al-Fusail, Director General, NWSA or his designee.

C. AID Liaison Official: Mr. Charles D. Ward, USAID Director or his designee.

D. Contractor: Technical Management Services, Inc. (TMSI) resident advisors.

**LOGISTIC SUPPORT**

**23. Provisions for Logistic Support**

A. Specific Items (insert "X" in applicable column as right. If entry needs qualification, insert asterisk and explain below in C. "Comments")	IN KIND SUPPLIED BY		FROM LOCAL CURRENCY SUPPLIED BY		TO BE PROVIDED OR ARRANGED BY SUPPLIER
	AID	COOPERATING COUNTRY	AID	COOPERATING COUNTRY	
(1) Office Space		II			
(2) Office Equipment		X			
(3) Housing and Utilities					N.A.
(4) Furniture					N.A.
(5) Household Equipment (Stoves, Refrig., etc.)					N.A.
(6) Transportation in Cooperating Country		II			
(7) Transportation To and From Country					X
(8) Interpreter Services/Secretarial		X			
(9) Medical Facilities	X				
(10) Vehicles (official)		X			
(11) Travel Arrangements/Tickets					X
(12)					
(13)					
(14)					
(15)					

(OTHER SPECIFY)

**B. Additional Facilities Available From Other Sources**

APO/FPO

PX

COMMISSARY

OTHER (Specify, e.g., duty free entry, tax exemption)

1. Embassy Recreation Association privileges to the extent available.

2. Use of Embassy Health Unit and pouch facilities is authorized in accordance with existing rules and regulations.

#### D. Project Evaluation

The evaluation will be conducted by a team consisting of a senior water and sewerage authority advisor with experience in water and sewerage operations and administration, preferably in developing countries, and a training/personnel advisor also with water and sewerage experience. It is estimated that the above scope of work requires four weeks of the senior water and sewerage authority specialist and two weeks of the training/personnel specialist in Yemen and one additional week each in the U.S.A. for preparation of the final evaluation reports for a total of eight person weeks.

#### ATTACHMENT NUMBER 2

#### Estimated Budget

1. Salary and Overhead (Two months)	12,000.00
2. International Travel	4,400.00
3. International Per Diem	400.00
4. Local Per Diem (42 days at @138.00 per day)	5,796.00
5. Fee	2,000.00
6. MISC	<u>5,404.00</u>
	\$30,000.00

3/7/81

- a) Ability to function effectively without outside technical assistance.
- b) Ability to obtain and utilize data, to make and carry out decisions based on such data.
- c) Ability to procure and maintain equipment.
- d) Overall ability to plan, construct, manage and operate urban water and sewerage systems. Determine the project's role in these functions.

4. Assess project work plans and contractor scope of work to determine:

- a) Whether type and quantity of project inputs are appropriate and can reasonably achieve project objectives and goal.
- b) Whether sequencing and prioritizing of inputs are reasonable. Support any recommended modifications.

5. Assess NWSA's ability to recruit, train and retain personnel.

6. Review NWSA's short and long-term staffing and training plans and evaluate their reasonableness in terms of: a) Requirements for institutional development; b) Existing financial, personnel and language limitations; and c) The mix among short and long-term, degree and non-degree, and U.S./third country and on-the-job training. Support any recommended modifications.

7. Assess the effectiveness of project training to date, for NWSA and for the participants.

8. Describe the extent to which technical assistance advisors are serving as surrogate NWSA staff rather than as advisors. Assess how this affects progress towards achieving project purposes. Recommend how current technical assistance might be made more effective.

9. Make and support such additional recommendations as might promote progress towards achievement of project objectives and goal.

### C. Reports

The contractor will make an oral presentation and submit an outline report, with preliminary conclusions and recommendations, to NWSA and USAID prior to departure from Yemen. Within 30 days of receipt of comments from NWSA and USAID, the contractor will submit five copies of its final report in English to NWSA and five copies to USAID.

3/7/81

## ATTACHMENT NUMBER 1

STATEMENT OF WORKProject 279-0028  
Water Supply Systems ManagementA. General

The Water Supply Systems Management Project is designed to assist the National Water and Sewerage Authority (NWSA) to become an effective organization capable of planning, constructing, managing and operating urban water and sewerage systems as described in more detail in Annex 1 of the August 31, 1977 Grant Agreement between the T.A.R.G. and A.I.D. The project will contribute toward this purpose by providing advisory services and academic and non-academic training to NWSA staff and personnel.

The project evaluation will:

1. Evaluate progress towards attainment of project objectives and goals.
2. Recommend revision of project objectives and goals as appropriate, and recommend project modification/reduction if appropriate.
3. Identify and evaluate problems or conditions which may impede progress towards those objectives;
4. Assess what steps can be taken to overcome or minimize those problems.

B. Scope of Work - Specific Tasks

In conducting the project evaluation, the consultant shall include the following:

1. Review all project documentation including the Project Paper, Project Grant Agreement, Project Implementation Letters, the TMSI contract and TMSI's periodic and monthly reports. The team will spend one to two days in ADD/ prior to travel to Yemen to review documentation and hold background discussions with relevant project personnel.
2. To the extent possible, identify and quantify project progress to date, e.g. person-months of technical assistance provided, person-months of training received, project equipment procured, and contract reports prepared by TMSI, etc.
3. Describe NWSA's functions, processes and recommend improvements in its:

# Department of State

TELEGRAM

J.P.

PAGE 01 STATE 102592  
ORIGIN AID-35

3367 061439 AID8702

STATE 102592

3367 061439 AID2702

RECOMMEND THAT THEY REMAIN SEPARATE AND  
DISTINCT. HAIG

ORIGIN OFFICE NEPD-04  
INFO AAHE-01 NEDP-02 HETC-04 NEHA-03 AADS-01 DSHE-01 ENGR-02  
RELO-01 SC-00 /019 AB

INFO OCT-00 /035 R

DRAFTED BY AID/NE/PD:PHOLMES:RLY  
APPROVED BY AID/NE/PD:RHBELL  
AID/DS/HEA:GMCJUNKIN (INFO)  
AID/NE/TECH/H:JHARATANI (INFO)  
AID/PD/ENG:FHONTANARI (INFO)  
AID/NE/NEHA:CCROWLEY  
AID/NE/PD/NEHA:JWILLIAMS

-----134174 220639Z /34

R 220552Z APR 81  
FM SECSTATE WASHDC  
TO AMEMBASSY SAHAA

UNCLAS STATE 102592

AIDAC

E.O. 12065: N/A

**TAGS:**

SUBJECT: PROJECTS 279-0028 (WATER SUPPLY SYSTEM  
MANAGEMENT) AND 279-0043 (WATER RESOURCES PLANNING  
AND MANAGEMENT)

REF: A) SAHAA 2555 B) SAHAA 1959

1. REF B, MISROUTED BY CABLE ROOM, ARRIVAL IN NE/PD  
APRIL 17, 1981. RE REF A, HAVE REQUESTED WASH  
PROJECT TO EXPLORE AVAILABILITY OF BOTH SHIPMAN AND  
CALBERT FOR 026 EVALUATION. DR. BLOOD DOES NOT  
BELIEVE SCOPE OF ACTIVITY IS APPROPRIATE TO HIS  
TRAINING AND EXPERIENCE. AID/W REVIEW OF CV OBTAINED  
FROM DR. BUTT (COPY POUCHED TO USAID) INDICATES THAT  
WHILE HE DOES SPEAK ARABIC, HIS FOCUS HAS BEEN ON  
THE TRAINING AND EVALUATION OF EDUCATIONAL PERSONNEL.  
SINCE HE HAS NO EXPERIENCE IN THE TECHNICAL AREAS  
OF INTEREST WE BELIEVE HE IS NOT THE MOST  
APPROPRIATE CANDIDATE. WILL ADVISE.

2. RE. 043 CANDIDATES, DR. MOORE APPRECIATES USAID'S  
EXPRESSION OF CONFIDENCE BUT DECLINES OFFER. HAVE  
REQUESTED BOTH WASH AND USGS TO PROPOSE CANDIDATES  
AND WILL ADVISE.

3. SUGGESTIONS PARAS 3 AND 4 REF B TO USE SAME  
TRAINING/PERSONNEL SPECIALIST AND TO COMMENCE BOTH  
EVALUATIONS SIMULTANEOUSLY MAY POSE SUBSTANTIVE  
AND COORDINATION PROBLEMS. PIO/T NO. 279-0043-3-  
90119 ARRIVED APRIL 17, 1981 AND SPECIFIC  
CANDIDATE NOT YET IDENTIFIED. IN IDEAL CASE 028  
WOULD BE A WASH ORDER OF TECHNICAL DIRECTION  
WHILE 043 WILL BE DONE BY USGS VIA A PASA. IT  
WOULD BE DIFFICULT FOR THE SAME SPECIALIST TO  
SIMULTANEOUSLY SERVE TWO MASTERS, PARTICULARLY  
WHEN IT COMES TO PREPARING REPORTS. GIVEN NORMAL  
CHANGES AND SLIPPAGES TO CONSULTANCY TDY'S, ALSO  
BELIEVE IT WOULD BE VERY HARD TO ASSURE 2 WEEKS  
WORK WITH ONE TEAM IMMEDIATELY FOLLOWING TWO WEEKS  
WITH THE OTHER. IN ADDITION WE QUESTION WHETHER  
COST SAVINGS WOULD BE THAT SIGNIFICANT AND  
WHETHER SIMULTANEOUS SCHEDULING MAY COMPLICATE  
USAID COORDINATION. WHILE WE WILL TRY TO ASSURE  
THAT BOTH EVALUATIONS BEGIN IN EARLY MAY,

*McJunkin*

UNCLASSIFIED

# Department of State

TELEGRAM

PAGE 01  
ACTION AID-35

SANAA 01800 170725Z

2291

AID5702

INFO NETC-04 NCNA-03 NEJL-03 NEEM-01 STA-10 CMGT-02 CTR-02  
CHR-01 RELG-01 MAST-01 028 A4 817

INFO OCT-01 036 W

-----312233 170725Z /34

R 170638Z MAR 81  
FM AMEMBASSY SANAA  
TO AMEMBASSY AMMAN  
INFO SECSTATE WASHDC 6624

UNCLAS SANAA 1800

AIDAC

E. O. 12065: NA

SUBJ: PROPOSED TDY - AID CONTRACTOR JARIR DAJANI

1. MISSION UNDERSTAND DAJANI IS WORKING UNDER CONTRACT WITH USAID/AMMAN. WE WISH TO KNOW IF HE COULD BE AVAILABLE FOR 1 MONTH TO PARTICIPATE IN EVALUATION OF TWO INSTITUTIONAL DEVELOPMENT PROJECTS AS TRAINING/PERSONNEL SPECIALIST.
2. BROADLY, DAJANI WILL BE RESPONSIBLE FOR ASSESSING PROGRESS TOWARDS ATTAINMENT OF OBJECTIVES IN AREAS OF TRAINING AND STAFFING OF CONCERNED HOST GOVERNMENT AGENCIES. THIS ASSESSMENT WILL INCLUDE IDENTIFICATION OF PROBLEMS AND EVALUATION OF CONDITIONS WHICH MAY IMPEDE PROGRESS ALONG WITH RECOMMENDATION FOR STEPS TO BE TAKEN TO OVERCOME/MINIMIZE THESE PROBLEMS. SPECIFICALLY, ABILITY OF HOST GOVERNMENT AGENCIES TO RECRUIT, TRAIN, AND RETAIN PERSONNEL WILL BE ASSESSED. IT WILL INVOLVE A REVIEW OF TRAINING PLANS AND TRAINING MIX AMONG SHORT AND LONG TERM, DEGREE AND NON-DEGREE, U. S. /THIRD COUNTRY, AND ON-THE-JOB TRAINING WITH RECOMMENDATIONS FOR POSSIBLE MODIFICATIONS. EFFECTIVENESS OF TRAINING FOR GOVERNMENT AGENCIES AND PARTICIPANTS WILL ALSO BE DETERMINED.
3. DAJANI WILL WORK WITH A SENIOR WATER AND SEWERAGE AUTHORITY ADVISOR (EVALUATOR) ON ONE PROJECT, AND WITH A SENIOR MANAGEMENT HYDROLOGIST ON THE OTHER FOR APPROXIMATELY 2 WEEKS EACH. BOTH PROJECT EVALUATIONS ARE CURRENTLY SCHEDULED ON OR AFTER MAY 1, 1981.
4. BOTH PROPOSED EVALUATIONS WILL BE PROJECT FUNDED. IF IT APPEARS DAJANI CAN BE MADE AVAILABLE, REQUEST MISSION ESTIMATE OF FUNDING REQUIREMENTS.
5. PLEASE ADVISE POSSIBLE AVAILABILITY OF DAJANI ASAP.

LANE

UNCLASSIFIED

Department of State

TELEGRAM

PAGE 01 SANAA 01959 231319Z 7158 026453 AID0204

ACTION OFFICE NENA-C3  
INFO NETC-04 PPCE-C1 PDPR-01 PPPB-03 PPEA-01 STA-10 RELO-01  
MAST-01 /025 A2 023

INFO OCT-01 /036 W -----077732 231319Z /34

R 231131Z MAR 81  
FM AMEMBASSY SANAA  
TO SECSTATE WASHDC 6702

UNCLAS SANAA 1959

AIDAC

E. O. 12055: N/A  
SUBJECT: EVALUATIONS OF PROJECTS 279-0028 AND 279-0043

REF: (A) SANAA 1800

1. BOTH PIO/T'S FOR SUBJECT PROJECTS EVALUATION HAVE BEEN PROCESSED. COPIES OF PIO/T FOR PROJECT 0028 EVALUATION WERE POUCHED ON MARCH 10, AND PIO/T FOR PROJECT 0043 EVALUATION IS BEING POUCHED NOW.

2. IN ADDITION TO USING SERVICES OF DAJANI (ASSUMING HIS AVAILABILITY) PER REFTTEL, USAID RECOMMENDS AID/W CONTACT DR. WALTER MOORE OF THE UNIVERSITY OF TEXAS AT AUSTIN FOR PROJECT 0043 EVALUATION AS POSSIBLE SENIOR MANAGEMENT HYDROLOGIST. USAID, HOWEVER, HAS NO RECOMMENDATION REGARDING SERVICES OF SENIOR WATER AND SEWERAGE AUTHORITY CONSULTANT FOR PROJECT 0028 EVALUATION.

3. PIO/T'S PROVIDE FOR 4 WEEKS OF SERVICES OF EACH IN FIELD AND ONE ADDITIONAL WEEK EACH IN U. S. TRAINING/PERSONNEL SPECIALIST WILL SPEND HIS 4 WEEKS ON BOTH PROJECTS (2 WEEKS FOR EACH PROJECT).

4. USAID DESIRES BOTH EVALUATIONS TO BE COMMENCED SIMULTANEOUSLY ON OR AFTER MAY 1, 1981.  
LANE

## APPENDIX B

### Itineraries

#### For Mr. Martin Lang:\*

- June 8-10 - Travel from New York to Paris to Sana'a
- June 10 - 6:00 am arrived at Sana'a, project work
- June 11 - Project work, review of records, and interviews
- June 12 - NWSA and AID closed, worked on Organizational Charts
- June 13 - Continued work on Organizational Charts
- June 14 - At NWSA and AID, interviews and report reviews
- June 15 - At Sana'a Branch and then Headquarters NWSA
- June 16 - Reviewed work and interviewed Training Officers, NWSA and AID, worked with Mr. Calbert on Training Report, wrote Executive Synopsis
- June 17 - Briefing of AID personnel
- June 18 - Lengthy interviews of top command at NWSA, Al-Fusail
- June 19 - Sightseeing
- June 20 - Travel to Taiz, interviews and inspection of Branch
- June 21 - At Taiz, inspection of Branch, interviews with operating personnel, long cross-country inspection of new facilities, wrap up meeting with Accountant, Branch Manager, and Technical Manager

In the evening, traveled to Hodeida

---

\* Please note: Saturday and Sunday are working days in Yemen and Friday is the Moslem sabbath.

- June 22 - At Hodeida, meetings, interviews, inspections, meeting with Arab Fund officials, and meeting with Resident Consultant
- June 23 - Wrap-up briefings in Branch Headquarters and traveled to Sana'a
- June 24 - Briefed Young/Hahn, gave copies of Executive Synopsis, lengthy briefing of Al-Fusail and Al-Kaisi, started Executive Summary
- June 25 - Continued Executive Summary all day
- June 26 - Turned over Executive Summary for typing and started rest of report and continued
- June 27 - Left more material for typing, at AID and NWSA, assembled preliminary draft for pre-review by Ali and Kosheleff
- June 28 - Back to AID for briefing to Ward, Chief of Mission, left preliminary draft there, back to hotel to finish report until late at night
- June 29 - At AID and NWSA with advisers, long debriefing of Abu-Talib, left copy for him and Al-Kaisi with Bailey
- June 30 - Left for Cairo

For Mr. Clarence Calbert

- June 5 - Arrived at Yemen
- June 6 - USAID Mission, NWSA Headquarters, and TMSI Office
- June 7 - USAID Mission and NWSA Headquarters
- June 8 - USAID Mission and NWSA Headquarters
- June 9 - USAID Mission and NWSA Headquarters
- June 10 - USAID Mission and NWSA Headquarters
- June 11 - NWSA Headquarters
- June 13 - NWSA Headquarters and TMSI Office
- June 14 - USAID Mission and NWSA Headquarters
- June 15 - NWSA Headquarter, Sana'a Branch Office, and pumping station
- June 16 - NWSA Headquarters and USAID Mission
- June 17 - NWSA Headquarters and TMSI Offices
- June 18 - NWSA Headquarters, USAID Mission and TMSI Office
- June 19 - Departed Yemen

APPENDIX C

Officials Interviewed

The reporting team is indebted to the following people, whose patience and cooperation contributed greatly to our mission.

NATIONAL WATER & SEWERAGE AUTHORITY, YAR

Mohammed Ali Al-Fusail  
Director-General

Mohammed A. Abu-Taleb  
Assistant Director-General & Executive Director

Mustafa M. Al-Kaisi  
Legal & Internal Relations Officer

Hussein Al-Ansi  
Acting Administrative Manager

Abdul Rahman S. Nagi  
Technical Manager

Al-Nahhas Hussein  
Financial Manager

Yasi Abdul Ismail  
Acting Staff Training Coordinator

Abbas Al-Mutawakil  
Sana'a Branch Manager

Yahia Al-Kibsi  
Chief Accountant, Sana'a Branch

Mahmoud Kabir  
Acting Technical Manager, Sana'a Branch

Sana'a Branch Staff:

Accountants  
Meter Repair Man  
Pumping Station Operators  
Pumping Station Foreman  
Chlorinator Operator

Ali M. Abdul-Aziz  
Branch Manager, Taiz

Mohammed A. Abdul Razzag  
Technical Manager, Taiz

Ahmed Abdul Hafiz  
Financial Manager, Taiz

Abdul Bari  
Chief Accountant, Taiz

Ali Selah Helaan  
NWSA Administrator of H&S contract, Taiz

Mr. Buchanan  
H&S Project Manager, Taiz

Richard Fahey  
H&S Project Engineer, Taiz

Taiz Branch Staff:

Warehouse Supt.  
Wellfield Pumping Station Staff

Hamoud N. Humran  
Branch Manager, Hodeida

Abdul Wahab Al-Muayud  
Technical Manager, Hodeida

Ibrahim S. Farrah  
Personnel Officer, Hodeida

Abdul Hai  
Financial Manager & Acting Admin. Manager, Hodeida

Hodeida Staff:

Chief Pipefitter Foreman, Mr. Babasaleh  
Foreman, Wellfield #1

Peter Rihlmann  
Resident Project Engineer, GITEC, Hodeida

ARAB FUND

Dr. Ghiyath F. Nakshbendi  
Financial Expert, Arab Fund for Economic & Social Development

Dr. Mahmoud  
Water Quality Expert, Arab Fund

TMSI

Thomas E. Bailey  
Technical Adviser, Team Leader

Robert Wooster  
Financial Adviser, Headquarters

Mohammed Ibrahim  
Financial Adviser, Branches

William Mabry  
Civil/Pipelines Advisor

Asbjorn Neillsen  
Electrical Maintenance Adviser/Sana'a Branch

Betty Bailey  
Office Manager

USAID

Charles Ward  
Mission Director

Zachary Hahn  
Capital Resources Development Officer

F. Le Young  
Project Officer

Dr. Bashati Ali  
Project Officer

Mr. Cox  
Training Officer

Burno Kosheleff  
Planning Officer

Robert Burford  
Comptroller

Tina Ferguson  
Administrative Assistant

OTHER CONSULTANTS

Robert M. Beall  
Hydrologist, U.S.G.S.

Edward Bradley  
Consulting Hydro-geologist

APPENDIX D  
DOCUMENTS REVIEWED

- Report, John F. Kennedy Water System, Taiz, Yemen  
Camp Dresser & McKee International, Inc., 1971
- Area Handbook for the Yemen  
U.S. Government Printing Office, 1977
- Report to U.S. Department of State AID  
Feasibility Study of Water Supply and Sewerage Facilities  
for Taiz, YAR, James M. Montgomery, Consulting Engineers,  
Inc., (undated)
- Report on Water Resources Sector Study in the YAR  
Prepared for USAID, Project No. 298-0035, August 15, 1977
- Project Assistance Paper, USAID  
Yemen: Water Supply Systems Management (1976?)
- Seven Quarterly Reports  
TMSI to Director-General, NWSA, period from July 1, 1979  
through March 31, 1981
- Twenty-three Monthly Reports  
TMSI to Director-General, NWSA, period from July 1, 1979  
through May 31, 1981
- Project Completion Report  
Sana'a Water Supply Project Phase I, NWSA Report to World  
Bank, December 1980
- Contract: Between the National Water and Sewerage Authority  
and Technical Management Services, Inc., For: Public  
Utility Technical and Managerial Services - Yemen Arab  
Republic, May, 1979
- Special Report No. 1  
Long Range Organizational and Capital Development Plan,  
TMSI to NWSA, August, 1981
- Special Report No. 17  
Transportation Plan for Operation and Maintenance, April  
1981
- Special Report No. 13/14  
Water System Operation and Maintenance Guideline Manual,  
March, 1981

Accounting System

Draft of Special Report, June, 1981

Water Supply and Savings Study

YAR, IBRD - IDA, 1972

Special Report No. 2

Procedures to Aid the Decision Making Process, TMSI to  
NWSA, February, 1981

WHO Rapid Assessment Report - YAR

Report to the Board of Directors by NWSA

Taiz Water & Sewerage Project, 1980