

PN 030-492

LOCAL DEVELOPMENT II - PROVINCIAL

مشروع التنمية المحلية

LD II-P

FINANCED BY U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

مصدر التمويل : الوكالة الأمريكية للتنمية الدولية

UPGRADING MAINTENANCE OF VILLAGE WATER SYSTEMS
START UP REPORT

Contract No.: 263-0182-C-00-8041-C0
Project No.: 263-0182-3-60054

Prepared by
Chemonics/Cairo

December 1988

O&M-R-2 (E)

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EXECUTIVE SUMMARY

The purpose of the Start Up report is to outline the plan of action to fulfill the requirements of the USAID to assist ORDEV with Upgrading the Maintenance of Village Water Systems as stated in the scope of works for the Local Development II Provincial project. The main task has been sub-divided into three sections namely g.5.i, g.5.ii, and g.5.iii which are -

- i to assist the Governorates develop annual maintenance plans for water systems;
- ii to conduct leak surveys and O&M assessments in at least five villages;
- iii to develop local and private sector expertise in water leak detection and O&M assessment.

*Done
p.e. Johnson*

Chemonics, the consultant providing services to ORDEV for USAID, developed a strategy in the 1988-89 Annual Work Plan to group together the three sub-tasks and complete their contractual obligations through studies and training in five pilot villages.

The first objective was to choose the pilot villages meeting with selection criteria developed by CHEMONICS and approved by ORDEV and USAID. Most important of these criteria was to select villages in easy reach of Cairo thus minimizing the travelling time necessary during the early phases of the program. USAID stipulated that selection be restricted to those villages with a substantial investment of BVS funds in water projects.

World Health Organization (WHO) are conducting a project for ORDEV on a leakage control study in six villages. Agreement was reached with ORDEV that, in the national interests, control of water losses should be introduced in as many governorates as possible. Therefore the pilot villages for this project should be in governorates different from those selected by WHO. This was done with the exception of Giza Governorate where the experiences by the village in improving the water supply system at Sakkara, the location of a Government Training Center, could be incorporated into future training courses.

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Five preliminary pilot villages in the governorates of Gharbiya, Giza, Menufiya, Qalubiya and Sharqiya were selected using the agreed criteria, and meetings were held with the Secretary-Generals to -

introduce the water system loss reduction program;

seek their approval to pilot village selection; and,

request the appointment of counterpart staff from the governorate, markaz, and village to work on the program.

*binm...
leakage control*

The Secretary-Generals all committed their wholehearted support to the program, agreed to the preliminary named pilot villages and nominated counterpart staff. The villages finally selected are -

Nahtai	Gharbiya Governorate
Sakkara	Giza Governorate
Abnahs	Menufiya Governorate
Moshtohor	Qalubiya Governorate and
Sennawha	Sharqiya Governorate.

We consider it is premature to suppose private sector involvement is required for conducting leakage control work and O&M assessment on the village water systems. Better that a needs assessment be made during the pilot village surveys before involving the private sector in this work. Therefore, no provision is made in the Annual Work Plan for selecting or training private sector firms.

Two long term Advisers have been allocated to spend 78 % of their time on task 9.5, also the counterpart engineers in each governorate will be called on to assist with the data collection and preparation of maps.

Difficulties are foreseen which will limit the progress of the tasks. These include the low recurrent operating budget available to the village councils; the low pay of O&M staff and the lack of incentive for staff to undergo training; the lack of record maps of networks and pump stations; and the lack of basic information such as the quantity of water supplied to the distribution network and the capacity rating of wells and pump sets.

The anticipated outcomes of the program during the period ending September 1989 are -

- a) counterpart staff trained to introduce O&M improvements for water systems in villages other than the pilot villages;
- b) an analysis of basic data from the five pilot villages to find the existing level of service received by consumers and difficulties experienced by village staff with the O&M of water systems;

- c) the development and testing of simple and appropriate changes to improve the efficiency and effectiveness of O&M of village water systems;
- d) prepare guidelines of those changes which prove in the field to generate the greatest improvement for the least effort;
- e) hold a workshop for all the counterpart staff to review the guidelines and modify them depending on the outcome of the workshop;
- f) hold a second workshop or series of workshops for one engineer from each of the remaining markaz within the pilot Governorates to review the second draft of the guidelines. Again they will be refined depending on the outcome of the workshop; and,
- g) assess the need to involve private sector firms with leakage control work and O&M reviews.

In addition the Annual Work Plan proposes the use of final year engineering graduates to assist with the collection and analysis of data. Also the counterpart staff from the five governorates will be encouraged to improve the water system O&M in a village other than the pilot villages. If this parallel program is performed then the advisers will be available to assist with any problems arising in the second village. The overall advantage is that ten instead of five villages will have improved water system O&M by the end of the project period.

Lack of existing data on the the amount of water supplied to the distribution networks makes it impossible to establish the existing water system performance or monitor the results of changes with respect to losses and O&M efficiency. Without proper equipment considerable time will be spent establishing pump station productions by volumetric methods. Afterward there will be no way of verifying the data recorded by the operators.

The purchase of data loggers with flow and pressure instruments is strongly recommended. Such equipment will vastly improve the quality and quantity of data collected within the project duration. Data loggers will have the added benefit of providing much needed basic data to improve the quality of new water sub-projects constructed with LD II Block Grant funds.

CHAPTER I
INTRODUCTION

I. INTRODUCTION

A. Purpose

The purpose of this start-up report is to outline the approach to meeting the requirements of Tasks g.5 (i), (ii), and (iii) of the USAID Contract No. 263-0182-C-8041-00 dated 23rd February, 1988 (Ref: 1). The main focus of these tasks are to improve the O & M of water systems in Egyptian villages, including the reduction of water losses.¹

This report is a deliverable under Task g.5 (ii) of the 1988-89 Annual Work Plan (Ref: 2) submitted to USAID and ORDEV by CHEMONICS International Consulting Division in October, 1988.

B. Background

Several previous studies report on the problem of losses from water systems supplying Egyptian villages. The 1980 study on Provincial Water Supplies (Ref: 3) found losses to be 40 % of supply, and more recently the 1987 study Water Supply and Sanitary Drainage for Qena and Aswan Governorates (Ref: 4) report water losses from old systems to be 30 % of supply. Neither report explains how the losses were determined nor the hours water is supplied in the villages surveyed. Obviously the reported loss figures is understated if water is supplied for less than 24 hrs per day.

In the Assessment of Village Water Systems in Egypt (Ref: 5), completed by WASH (Water and Sanitation for Health Project) in March 1988, the pertinent findings were -

- o more water from water supply systems is lost by leakage and waste than consumed by the people;
- o the level of service is such that about 31 % of the rural population have access to individual house connections and there are insufficient public standpipes to serve the remainder; and
- o supplies are generally intermittent, often only providing water between 6 to 8 hours daily.

¹ "Losses" include wastage from poor operating procedures; unmetered consumption; stopped meters; and leakage from pipelines, tanks etc. Losses are sometimes referred to as unaccounted for water or UFW.

An on-going program relevant to task g.5, is a Leakage Detection Program undertaken by WHO (World Health Organization). WHO are monitoring four water systems by meters and data loggers to measure the losses resulting from leaking mains. WHO have experienced difficulties finding water systems operating 24 hours daily. A condition essential for both ensuring demands are satisfied and diagnosing leakage.

ORDEV is responsible for both the WHO program and the program under task g.5. They are anxious that the two programs do not overlap.

C. Scope of Works

USAID are addressing a national problem in Egypt, that of reducing piped water losses, by selecting the contents of sub-tasks under g.5. Section g.5 - Upgrading Maintenance of Village Water Systems of the Contract requires services be applied to the following specific tasks -

- g.5.i - Water System Maintenance Plans;
- g.5.ii - Water System Leak Survey and O & M Assessment; and
- g.5.iii - Develop Local Public and Private Sector Expertise in Water Leak Detection and Water System O & M Assessment.

The strategy developed in the 1988-89 Annual Work Plan (AWP) is to group these tasks together and develop a improvements from the experiences gained by working in the five pilot villages, each in a different Governorate. Within the 15 month duration of the AWP, it will not be possible to complete the Private and Public sector training called for under Task g.5.iii. Indeed the need for private sector involvement can only be assessed from an in-depth study of the pilot villages.

An alternative to training selected personnel from the private sector is to involve final year Engineering Graduates with program. The experiences they gain has the potential of them developing a skill that can be apply throughout their careers.

D. Objectives

The primary objectives of the work program, and the direct benefit to ORDEV and the five selected Governorates will be twofold.

First, counterpart staff working with the Advisers will be trained in improved methods of operating water systems and reducing losses. The intention is for the Chemonics Advisers to work with five counterparts in each village. One each from ORDEV Cairo, the pilot Governorate and the pilot Markaz, and two from the pilot village.

Secondly, there will be improvements to the operation management of the water systems in the five pilot villages, resulting in a decrease in operating costs and an increase in revenues collected.

Finally, an in-depth study of the water systems in five different pilot villages will give a clear picture of the actual (rather than perceived) problems in operating water systems experienced by the public sector.

There will also be some secondary benefits from the program. One of these could be recommendations on appropriate revised designs for future water sub-projects. Other benefits may include the development of future plans for improved institutional development and tariff structures.

The following chapters outline -

- o the method used to select the five pilot villages;
- o the proposed work program with potential restraints; and
- o the resources needed to achieve the maximum benefits from the tasks set out in the Annual Work Plan.

CHAPTER II
VILLAGE SELECTION

II. VILLAGE SELECTION

A. General

The Adviser responsible for the pilot village program arrived in country during early May 1988. In the first few weeks of his assignment a study was made of previous reports and details were obtained of other similar programs already in progress. A Leakage Control program for cities and villages in the Governorates of Daqahlia, Fayoum and Giza is being managed by WHO. Since WHO and CHEMONICS share the same client ORDEV, it seemed prudent for the two consulting organizations to corroborate.

A series of discussions between WHO and CHEMONICS were held during June and July 1988, when it was agreed in principle that the selected pilot villages for the LD II-P program should be in Governorates different from those selected for the WHO program. It was also learned that the WHO program is limited strictly to monitoring water leakage using meters and electronic data loggers at six different stations on four water systems.

The first step in the LD II(P) program was to establish criteria for selecting the pilot villages, which met the approval of both USAID and ORDEV.

B. Selection Criteria

The following five criteria for selecting the pilot villages were submitted to USAID and ORDEV for approval -

- i Easy access to Cairo. A prime requisite to allow the two Advisers to spend the most time in the villages by minimizing travel time.
- ii High BVS investment in water sub-projects. A requirement specified by USAID in the LD II(P) Contract.
- iii A mix between regional and independent water supply systems. The approach to loss reduction and improved O&M differs from one system to another.
- iv The villages be in different Governorates. Thus involving the maximum number of counterpart Engineers within the limits of the program.
- v Avoid overlap with the WHO program. ORDEV, WHO and CHEMONICS agreed the greatest national benefit will be gained by spreading the limited resources of the two program as widely as possible.

Subsequently two waivers were necessary to the original criteria. WHO are already working in Fayoum, the nearest governorate to Cairo with a regional water supply system and other villages with regional supplies are beyond the practical travelling distance from Cairo. So no village connected to a regional network will be included in the program.

However, a difference is faced at Sakkara Village, Giza, where all the consumers receive unmetered supplies. It will be interesting to determine if the per capita consumption is greater here than at the other villages where consumption is metered.

The second waiver was the selection of Sakkara in Giza Governorate. Although this conflicts with the criteria to avoid overlap with the WHO program, there is a Government Training Center at Sakkara and experiences gained from a pilot study of the village can be incorporated into future training courses.

ORDEV, USAID and WHO, agreed on the preliminary selection of villages conforming with the amended criteria in the five governorates of Giza, Gharbiya, Menufiya, Qalubiya, and Sharqiya. Minutes of the meeting agreeing to the preliminary selection of villages were circulated to the interested parties, see Appendix A.

The next step was to seek approval to the village selection by the Governorates.

C. Governorate Meetings

Meetings were held between 16th August and 21st September 1988 with the Secretary Generals at the Governorate Offices. The five meetings were attended by: representatives from ORDEV Cairo; the Governorate Director of ORDEV; often the Governorate counterpart Engineer; and two CHEMONICS Advisers. One additional meeting was held with ORDEV Cairo.

The three objectives of the meetings were -

- a) to explain the purposes of the proposed program;
- b) for the Secretary Generals to nominate counterpart staff to work with the CHEMONICS Advisers; and
- c) for the Secretary Generals to concur with the selection of the pilot village.

The Secretary Generals and staff at ORDEV, Cairo, were told the program will include reducing water losses; training counterpart staff from ORDEV, the Governorate, Markaz and Village in improved methods of operating and maintaining water systems; and improving the level of service to consumers.

The program will impact on record keeping (particularly of maps showing the layout of distribution networks) and on the balance between operating costs and revenues collected from water sales. Improved records will lay the groundwork for future leakage control work and planning of future water projects.

The Secretary Generals were told the LD II project will only provide two advisers and that funds for repairing faults and installing simple monitoring instruments will be the responsibility of the villages. The advisers will try minimize expenditure, but funds must be made available to repair leaking water storage tanks and pipes.

An excellent response was received to the presentation and the proposed program. In two instances CHEMONICS were asked to consider villages other than those proposed. However after considering the advantages and disadvantages of the alternate villages, ultimately the villages first proposed by CHEMONICS were approved by the Secretary Generals.

Proceedings of the five meetings were minuted and Arabic translations were sent to the Secretary Generals and ORDEV Cairo. Copies of the minutes are contained in Appendix B.

After the meetings with the Secretary Generals a second round of similar meetings were convened with the Markaz Chiefs and Village Executive Chiefs.

Vitally important to the continuation of the program after the end of the LD II services, is the setting up of a central body responsible for extending the program to Governorates other than the first five. ORDEV Cairo have the technical staff resources to perform this function, and agreed to allocate three engineering counterparts to join the CHEMONICS Advisers on field visits.

D. Selected Pilot Villages

The five approved pilot villages with details of the BVS expenditure on water sub-projects are shown in Figure 1 below -

APPROVED PILOT VILLAGES

ITEM	GOVERNORATE NAME	MARKAZ NAME	VILLAGE NAME	BVS INVESTMENT LE(k)
1	Gharbiya	Zefta	Nahtai	126
2	Giza	El Badrashin	Sakkara	187
3	Menufiya	Qesna	Abnabs	173
4	Qalubiya	Toukh	Moshtohor	411
5	Sharqiya	Minya El Kamh	Sennahwa	245

FIGURE 1

A location map of the selected villages is shown in Figure 2. The five villages have between them a total of fifteen independent water systems.

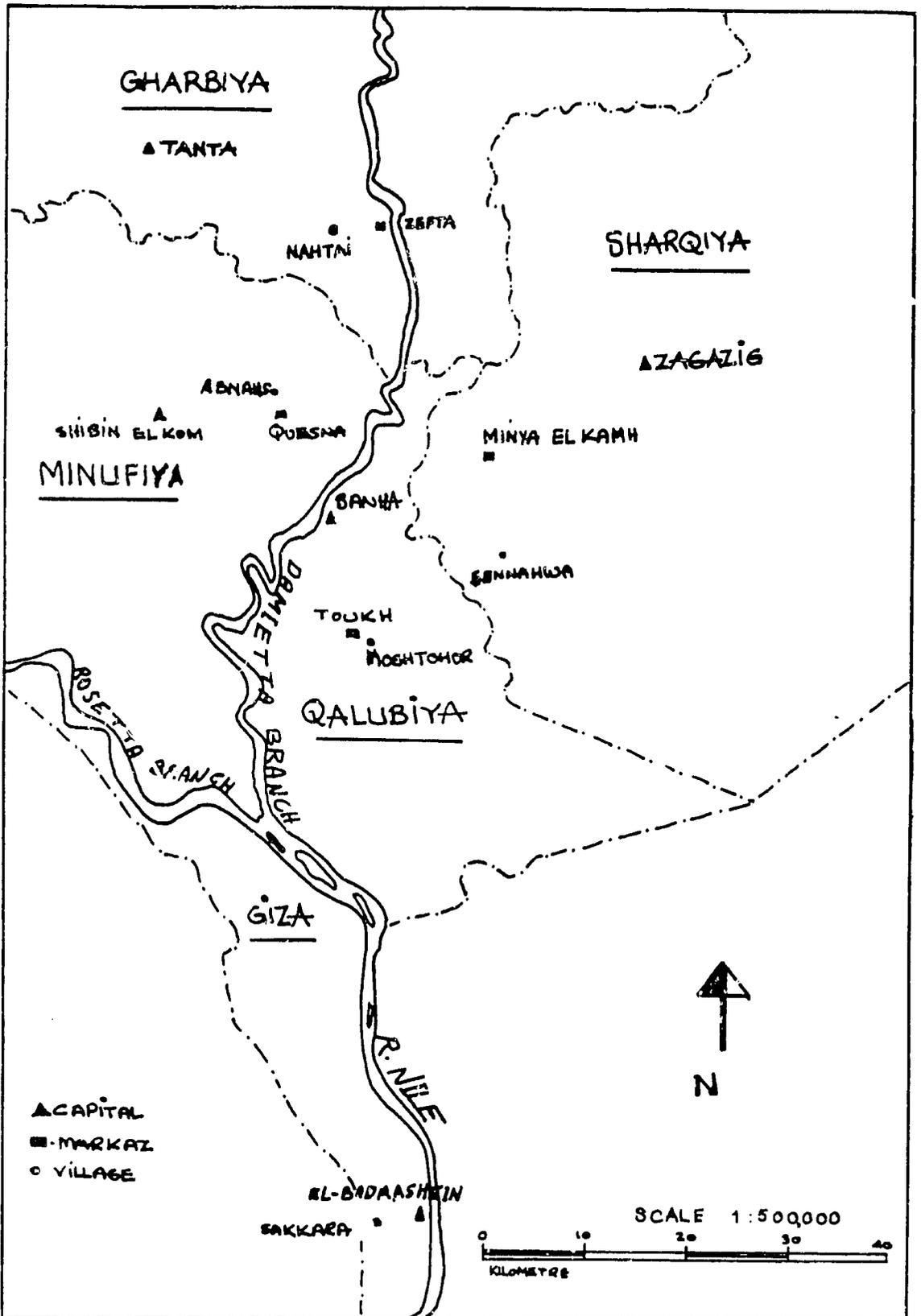


FIGURE - 2
 LOCATION OF PILOT VILLAGES
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CHAPTER III

WORK PROGRAM

III. WORK PROGRAM

A. Outline of Plan

The USAID Contract requires the Consultant to address three inter-related sub-tasks. All three fall under the general heading of Task g.5 "Upgrading Maintenance of Village Water Systems". Titles and brief descriptions of the sub-tasks are as follows -

Task g.5.i: "Water System Maintenance Plans", calls for assistance to the Governorates in designing and implementing annual maintenance plans, needed for them to qualify for Block Grants.

Task g.5.ii: "Water System Leak Survey and O&M Assessment", requires the Consultant to conduct a leak survey and an overall O&M assessment for potable water systems in at least five villages.

Task g.5.iii: "Develop Local Public and Private Sector Expertise in Water Leak Detection and Water System O&M Assessment", requires governorate and private sector candidates to be trained to undertake water leak detection surveys and assessment of water system O&M programs. The Contract requires the training of at least five engineers from each Governorate and twenty engineers from five different local private engineering firms. These requirements amount to the training of over 200 engineers.

The first Annual Work Plan (AWP) responds to contract tasks g.5.i, g.5.ii and g.5.iii within the manpower limitations of the adjusted duration of the contract. The five selected pilot villages will be used to -

develop appropriate methods for reducing losses;

again an in-depth understanding of the existing issues hindering O&M improvements of village water systems; and,

provide hands-on training for counterpart staff working with the Advisers.

Thereafter, the experiences gained from the pilot villages will be passed on to other villages in the same Governorates and eventually must be passed on to Governorates other than those with pilot villages. The key to extending the lessons learnt from the pilot villages will be a set of Guidelines developed by the counterpart staff under the mediation of Chemonics' Advisers.

Other highlights included in the plan to address the tasks are -

by developing a model O&M for a water system at Sakkara Village, future courses at Sakkara Training Center on water system O&M will benefit directly from the experiences gained by the waterworks staff at the village;

the possibility will be examined of including undergraduate engineers, as well as the counterpart staff, to assist in the program; and

an assessment of assistance required from private sector organisations for O&M and loss reduction programs.

For task g.5.iii there is a variation between the contract and the deliverables proposed by the Annual Work Plan. Reasons for this are fully discussed in the section - Limits of Program below. In the Consultant's opinion, it is premature to presuppose private sector involvement is needed before the capacity of the public authorities has been assessed. There may be little to be gained from using the private sector to conduct O&M assessments and loss reduction programs, as suggested by the Contract.

Extracts of the AWP text giving details of the three sub-tasks g.5 is included in Appendix C and a program work plan is shown in Figure 3. Appendix D is CHEMONICS reply dated November 1988 to ORDEV's letter giving brief details of the proposed water system program.

B. Inputs to Program

Two long term Advisors from the Consultant will spend an average of 78 % of their project time on the three sub-tasks. In addition 4 or 5 counterpart staff from ORDEV Cairo and each of the five Governorates are required to assist with data collection, thereby gaining hands-on experience. Short term advisers will be appointed as necessary.

The AWP states a total of 62 person weeks will be provided by two advisers (NFN & AA-W) over the 52 week duration of the plan. The nett time available is only 40 weeks per person after deducting 4 weeks each for vacations, public holidays, and contingencies. 78 % is the ratio of $62/(2 \times 40)$.

A successful outcome of the tasks depends largely on the efforts made and co-operation from counterpart staff appointed by the governorates and ORDEV.

Details of some flow and pressure instruments, and data loggers have been submitted to USAID with a request for funds. Equipment of this nature will greatly improve the quality of information collected, leading to greater progress during the program than otherwise will be the case. In the long term, it is proposed any monitoring equipment supplied under the contract will be used by ORDEV to extend the program to other Governorates. The equipment will enhance the timely completion of a nation-wide system loss reduction program, and supply valuable information for improving the design and effectiveness of future water projects.

C. Limits of program

Lack of resources at the village level are likely to be a major restraint for the program. Some of these limiting factors are -

- a) the extremely low recurrent expenditure budgets for operating water systems;
- b) staff employed on the O&M of water systems are generally poorly trained and grossly underpaid. There is also no incentive paid to staff who complete training programs;
- c) usually there are no record maps of distribution networks, pump station layouts and areas of supply; and
- d) rarely are there any records of repairs to mains, pump station outputs, well yields, water quality etc.

Also the time frame of the program with the manpower available to the Consultant is insufficient to fulfill the tasks specified in the contract. In particular, the task of training Governorate and Private sector employees is over ambitious.

The contract requires the Consultant to identify private sector local firms deemed capable of performing O&M assessments of village water systems and to conduct leakage control programs. Also there is a requirement to conduct a substantial leakage control training program for both the public and private sector staff. No provision has been made for either of these two tasks in the AWP.

We consider the most appropriate method of leakage control training program must first be determined from the pilot village surveys. These surveys will also help ascertain the level of effort required from the private sector in the O&M of water systems.

D. Outcomes of Program

The prime purpose of the tasks is to develop within the GOE the capability for improving the standard of water supply services to rural villages. Within the restraints of the resources of this project, the outcomes of the program will be as follows -

- a) counterpart staff trained to introduce O&M improvements for water systems in villages other than the pilot villages;
- b) an analysis of basic data from the five pilot villages to find the existing level of service received by consumers and difficulties experienced by village staff with the O&M of water systems;
- c) the development and testing of simple and appropriate changes to improve the efficiency and effectiveness of O&M of village water systems;
- d) prepare guidelines of those changes which prove in the field to generate the greatest improvement for the least effort;
- e) hold a workshop for all the counterpart staff to review the guidelines and modify them depending on the outcome of the workshop;
- f) hold a second workshop or series of workshops for one engineer from each of the remaining markaz within the pilot Governorates to review the second draft of the guidelines. again they will be refined depending on the outcome of the workshop; and,
- g) assess the need to involve private sector firms with leakage control work and O&M reviews.

The final outcome of the program will occur either during extension of this project or be incorporated into some future project. This final step involves holding a series of training courses for staff from the remaining Governorates introducing the agreed changes nation-wide. It is proposed these training courses be held at Sakkara Training School incorporating the experiences gained from the Sakkara Village studies into the course.

Figure 3 is a Gantt Chart showing the specific tasks scheduled in the AWP for the water system loss reduction program.

WORK PROGRAM OF
 TASK 6.5: UPGRADING MAINTENANCE OF VILLAGE WATER SYSTEMS

SUB - TASK	DURATION (Months)											
	1988			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep
g.5.1: TA in water system O&M planning.												
g.5.11: Water system loss survey.												
g.5.111: Develop local expertise in water loss reduction												
DELIVERABLES												
Start up Report			†									
Draft Report/Guidelines and first Workshop										†		
Revised Report/Guidelines and second Workshop												†
Final Report/Guidelines												†

FIGURE - 3

NOTES:

- 1) Started in May 1988 with the development of the village selection criteria.
- 2) By September 1988 data collection had started in all five pilot villages.
- 3) The Work Program above is extracted from the 1988-89 Annual Work Plan.

Secondary direct benefits to the five pilot villages resulting from experienced Advisers conducting intense studies of the practices in the villages include -

improved records;

a reduction of losses;

comprehensive data profiles (population, area of services, level of service, etc.); and,

possibly most important, a better understanding of water system designs that will be most appropriate for Egyptian villages.

This will be one of the first programs in recent times where an in depth study has been conducted on water systems in Egyptian villages, the outcomes are bound to lead to improvements within the context of the work plan. But there are some innovations that could enhance the current program or be introduced later.

E. Innovations

The AWP already proposes that final year Engineering Graduates be involved with the collection and analysis of data collected from the pilot villages. This proposal, if accepted by USAID will have to be developed, but could offer an alternative to the training program for private sector staff stated in the contract.

There would be a much greater impact from the program if each of the five Governorates selected a second village for the counterpart staff to apply the skills transferred to them by the Consultants Advisers working in the first village. The Advisers would be available to resolve any difficulties met by the counterparts working in the second village.

The policy of universal metering to raise water charges will be examined. It may be more revenues can be collected, with the saving in cost of a meter to consumers, by raising a fixed charge on consumers. Losses and wastage could be controlled by installing bulk, or district meters, and by training the meter readers to conduct leak control surveys.

CHAPTER IV
REQUIRED RESOURCES

IV. REQUIRED RESOURCES

A. Overview

There is evidence from first visits to the pilot villages that Village Executive Councils neglect to record some basic data on the water systems. Most of the pilot villages have a log to record pump operating times, know the number of metered consumers, and know the monthly consumption registered by consumer meters. None have bulk meters to register the daily output from pump stations; and few have either maps of the distribution network, records of repairs to pipes, or records of consumers/operators complaints.

The first two tasks of the Consultant will be to establish procedures for mapping the distribution networks; and establishing baseline records from which to monitor the effect of changes introduced during the work plan. An important indicator that needs to be determined at the beginning of the program is the percentage losses from the water system. In other words, an audit of the difference between the quantities of water produced and consumed.

Some of the pilot village systems supply water intermittently during the day. Any underground leaking pipe joints or broken pipes may result in contaminated ground water being sucked into the distribution network during supply shut-downs; polluting the water supplied to consumers. Monitoring the water supply using micro-biological indicators, will establish whether or not post-works contamination is a problem. If so, the prompt repair of faults will reduce the chance of contamination. Regular testing the water quality will indicate changes resulting from action taken.

Finally, after establishing the magnitude of water losses, an appropriate leakage control program will be designed. At that stage special leak noise and flow measuring equipment may be required to pinpoint underground leaks.

The following sections outline some equipment and instruments which will accelerate the program of data collection and provide a means of supervising the accuracy of records collected by operators.

B. Proposed Equipment

Three categories of equipment are required if the maximum benefit is to be gained from the study of the pilot villages. These are -

- o Instruments and data loggers to record flow and pressures of the supply system;

- o apparatus to perform micro-bacteriological tests on samples collect from the source works and the extremities of the distribution system. The most usual indicators are fecal and total coliform counts; and
- o miscellaneous equipment that will help locate buried metal valve box covers, and underground leaks from the pipelines.

Chemonics already has apparatus for conducting micro-bacteriological tests. Also available is equipment for detecting buried metal surface boxes, and sounding mains systems for leaks. This like all leak noise equipment depends on a main's pressures being at least 15m head.

Equipment not available is that needed to monitor the flow and pressures of water systems on a continuous basis for periods of 30 days and more. JSAID have been requested for funds to purchase flow meters, pressure transducers and date loggers as described in the next section.

C. Data Logging Monitoring Equipment

Few, if any, of the water works supplying rural communities have devices to measure the quantity of water supplied to the distribution mains. Without this essential basic data it is impossible to -

conduct baseline water audits by comparing the production with the consumption;

improve the efficiency of operating water systems by reducing the consumption of consumables (power, fuel and chemicals); and

design new water or wastewater systems which are cost-effective and efficient.

In short, flow meters and pressure recorders are needed to measure the "health" of the systems and to track the effect of introduced modifications to operating the systems and reducing losses. Also the same instruments will provide invaluable data for improving the design of future water and wastewater systems.

ORDEV are already supervising a leakage control program under a World Health Organization (WHO) project. WHO is using meters and data loggers which will eventually be taken over by ORDEV. It is logical that any equipment supplied under the LD II(P) project be compatible with equipment already in service. Therefore the equipment listed in the Bill of Quantities in Appendix E is identical to that used by WHO.

This proposed equipment is sufficient to install a pressure transducer and a bulk flow meter at each of the fifteen pump stations in the pilot villages, with a second pressure transducer installed at the end of each distribution network. It is proposed the data be recorded on electronic data loggers specially designed for the water industry to measure flow rates and pressures at frequent intervals.

The information recorded by the recommended data loggers can be loaded into a computer for analysis and will give a picture of the hours of supply, peak and minimum demands, average daily demands, weekly and monthly demands; and similar information on pressure. At the same time, a manual recording system will be introduced and the data logger will act as a temporary checking device to correct or modify the operators records.

In the long term the data loggers and meters will have a twofold purpose -

they are suitable for monitoring demands by sections of the distribution network supplying 500 to 1000 connections, which is the first stage of a leakage control program; and

they can be transferred to other villages to replicate a system loss analysis program.

D. Special Studies

The task g.5 in the LD II(P) project is the first opportunity under a USAID program to conduct a detailed study of the water supply system in Egyptian villages. As such there will be the opportunity to gain benefits other than those specifically stated in the task description. Some of those secondary benefits include reviewing-

the policies used to plan the extension of future water systems;

the level of service provided to consumers;

the standard designs currently used to construct wells, water towers and pump stations;

methods of improving the quality of future water projects;

the commercial aspects of managing the water supply system; and

methods of improving the control of water quality supplied to consumers.

It is envisaged under this project there will be the opportunities to use experts on short-term assignments such as -

- o a **Social Scientist** to conduct a survey to determine the level of water service the villages would like and what they are prepared to pay (or what they can afford);
- o a **Groundwater Specialist** to review the designs used for wells, for instance it may be possible to reduce the investment in wells by drilling new wells that supply more than one pump and drilling to a shallower depth than is currently the norm; and
- o a **Structural Designer** to review the standard design used for water towers and to propose revised designs that are more appropriate to the rural village situation.

Other studies could include a survey to determine the public health benefits of a safe water supply, public health public relation programs to deter women from using canals and other unsafe water sources for washing and drinking purposes.

APPENDIX-A
APPROVAL FOR VILLAGE SELECTION CRITERIA

MEETING NOTES

Date: 14 July 1988

Meeting with ORDEV, WHO and CHEMONICS at WHO Offices, Imbaba, on Wednesday 13 July 1988

1. Purpose:

For ORDEV and WHO to approve the name of five pilot villages for water system loss reduction surveys.

2. Present:

Mahmoud Shair, ORDEV, Mohamed El Alfy and Fathy Latef Omar, WHO, and Nigel Nicholson, Chemonics.

3. Discussion:

a) WHO and ORDEV agreed with the selection criteria as set out in Note a) Attachment A.

b) WHO is performing a leak detection program in the Governorates of Fayoum, Daqahlia and Giza. In principle it was agreed that Chemonics should avoid working in the same Governorates. However a special case was accepted for Giza.

c) All agreed that Saqara (Giza) be one of the Villages selected by Chemonics. As this village is the site of a Government Training Center, the system loss experiences could be incorporated into water loss training courses held at the center.

d) In principle those present agreed to the selection of the villages of Nahtai (Gharbia); Saqara (Giza); Abnahs (Menufiya); Moshtohor (Qalubiyah); and Sinhowa (Sharqiya).

FOLLOW-UP

(i) ORDEV will contact the five Governorates for their verbal agreement to co-operate in a system loss reduction program. ORDEV'S formal acceptance of the named villages will be received by Tuesday 19 July 1988.

(ii) Chemonics is to advise USAID of developments.

(iii) Chemonics and WHO agreed to meet monthly to discuss common interests in reduction of water losses. Provisionally the next meeting will be on 15th August at 09:00hrs, but is subject to the impending visit by Mr. Heide, the WHO visiting leakage expert.

(iv) After ORDEV, WHO and USAID confirm the five selected villages, ORDEV and Chemonics will hold initiation meetings of the five governorates of Giza, Gharbia, Menufiya, Qalubiya and Sharqiya.

v) Before finalizing the names of the five villages, each village will be subjected to a preliminary fact finding survey. Data collected will include an enquiry about the V.C financial and goodwill support of a loss reduction program.

cc: ORDEV
USAID
WHO
A. Gaber
J. Jordan
A. Wahab

ATTACHMENT A
VILLAGE SELECTION

<u>GOVERNORATE</u>	<u>MARKEZ</u>	<u>VILLAGE</u>	<u>REMARK</u>
1.Gharbiya	Zefta	NAHTA (1) (Sunbat(2))	LE126k on BVS WATER PROJECTS LE 129k
2.Giza	ElBadrashin	SAQQARA	LE187k on BVS Water Projects Area of training shool
3.Menoufiya	Qwesna Berket El Sabaa	ABNAHS (Hourien)	LE173k on BVS Water Project LE129k.
4.Qalubiya	Toukh Toukh	MOSHTOHOR (Baltan)	LE41k on BVS Water Project. LE308k on BVS WATER PROJECTS
5.Sharkqiya	Minya El Kamh (El Azizia)	SENNAHWA	LE245k on BVS Water Projects. LE140k on BVS.

NOTES:

a) Selection Criteria:

- o Easy access to Cairo to permit frequent visits (max supervision).
- o High BVS expenditure on Water Projects.
- o Regional and independent systems
- o No overlap with WHO work.
- o 4-5 different Governorates.

- b) WHO have studies in Daqahliya, Fayoum, and Giza. Agreed to exclude Fayoum and Daqahliya (Dr. Saleh 10 July) but include Giza because of Training potential. By excluding Fayoum, regional criteria is difficult, instead try to find village satellite supplied from remote station.
- c) Originally intended to exclude Menufiya Governorate as it is "over-studied." However it is deemed preferable to have five governorates.
- d) Round trip of northern Villages is 220 km to Saqara is 60 km (RT). Alternative is 3 days, (Moshtohour + Sinhowa (135km) - Abnaha + Nahtai (210 km) - Saqara (60 km).
- e) (1) Village names in capital letters are first choice whereas (2) possible alternative villages are in parenthesis.

APPENDIX - B
MINUTES OF MEETINGS WITH SECRETARY GENERALS

MEETING MINUTE

Date: 17th August 1988

Place: Qalubiya Secretary General's Office (Banha)
Date: 16th August 1988
Subject: Introductory to System Loss Reduction Program (S.L.R.P.)

The meeting began at 10:00 A.M.

Present:

Mr. Mohamed El-Said Abdel Karim	Secretary General
Mr. Said Fouad	Gov. ORDEV Director
Mr. Nabil Habib	Gov. ORDEV Dept.
Engr. Yehya Abu-El-Khair	Counterpart Engr.
Mr. Mahmoud El-Shaer	General Manager for Follow up (Cairo ORDEV)
Mr. Nigel Nicholson	Environment Advisor, Chemonics
Engr. Ayman Abdel-Wahab	Water Engineering Advisor, Chemonics

During the meeting, the following subjects were discussed:

1. Chemonics team briefed the Secretary General on the System Loss Reduction Program (SLRP) and explained to him the selection criteria for villages, and benefits of the program regarding field training, health and reduction in water losses.
2. The Secretary General appointed Engr. Yehya Abu-El-Khair as counterpart to Chemonics staff in the program.
3. It was emphasized that governorate/village inputs for the (SLRP) will include financing the installation of bulk meters and valves, the repair of defects and the collection of data. Chemonics contribution consists of two advisors responsible for reducing losses in five villages.

The Secretary General showed great interest in the program and promised to support it by all means available to him, he also asked for briefing on progress.

The meeting ended 11:30 A.M. and the team continued on to Markaz Toukh and Moshtohor V/C.

cc: File
EEG file
Dr. Ahmad Gaber
Nigel Nicholson
Mr. Mohamed El Sayed Abdel-Kariem, Secretary General,
Qalubiya

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MEETING MINUTE

Date: 24th August 1988

Place: Sharqiya Secretary General's Office (Zagazig)

Date: 22 August 1988

Subject: First Introductory to System Loss Reduction Program
(S.L.R.P.)

Present:

Mr. Ahmad Abdel-Latif El-Shaarawi	Secretary General
Mr. Mohamed Rashad	Gov. ORDEV Director
Mr. Nigel Nicholson	Environment Advisor, Chemonics
Engr. Ayman Abdel-Wahab	Water Engineering Advisor, Chemonics

The team briefed the audience about the SLRP and explained the obligations of the governorate towards the program.

During the meeting, the following subjects were discussed:

1. The Secretary General asked about the relation between leakage, ground water table, and sewage water. The team explained the water system differences and emphasized that the SLRP will concentrate only on drinking water loss reduction.
2. The Secretary General enquired about the final product of the program which will be to develop and introduce improvements to the O&M of water systems in the village. Reduction in system losses will be a key issue.
3. The Secretary General delegated the approval of the selected village and the appointment of the counterpart engineer to the ORDEV director, Housing Dept. director and El-Abbassa Water Authority chief.

The above mentioned personnel approved Chemonics' selection of Sanhout village, Minya El Kamh markaz, but the CPE is yet to be identified.

4. Chemonics contribution to the SLFP will be mainly the two advisors: Mr. Nigel Nicholson, and Engr. Ayman Abdel-Wahab.
5. The governorate, together with the selected village, will be responsible for updating records, pipe repair works, meters and valves installations, ... etc.
6. The team informed the Secretary General that a copy of the meeting minutes will be sent to him.
7. The Secretary General asked the Chemonics team to coordinate with the ORDEV director for future meetings and visits.

Mnts/33/NN/KF

MEETING MINUTES

Date: 22 September 1988

Place: Giza conference room (Giza)
Date: 21 September 1988
Subject: Introduction to System Loss Reduction Program (SLRP)

The meeting began at 12:15 p.m.

During the meeting, the following subjects were discussed:

1. CHEMONICS team briefed the Secretary General and those present on the System Loss Reduction Program (SLRP) and explained the selection criteria for villages, and benefited of the program regarding field training, health and reduction in water losses.
2. The Secretary General requested the team to consider selecting Saft El Laban VC instead of Sakkara VC explaining that having WHO working in Saft El Laban VC might be an advantage so as to avoid duplicating work. The team explained that WHO and CHEMONICS are working in different programs (water leak detection and system loss reduction respectively). The team also explained that one of the selection criteria for the villages agreed upon by WHO and CHEMONICS is to avoid conflict by not working in the same governorates. Giza is an exception since WHO and ORDEV agreed there is potential merit to selecting Sakkara, i.e., experience gained in reducing losses at Sakkara village could be incorporated into future training courses at Sakkara Training Center.
3. It was agreed that CHEMONICS team will visit both villages and report their findings.

The meeting ended at 1:00 p.m.

MEETING MINUTE

Date: 30th August 1988

Place: Gharbiya Secretary General's Office (Tanta)
Date: 29th August 1988
Subject: Introduction to System Loss Reduction Program (S.L.R.P.)

The meeting began at 10:30 A.M.

Present:

General Mohamed Ibrahim El-Toukhi	Secretary General
Mr. Hamed Amer	G'rate ORDEV Director
Engr. Mohamed Abdel-Monem Genawi	Markaz Tanta Maint. Coordinator
Engr. Aly Gharib Ads	G'rate Maintenance Coordinator
Engr. Abdel-Khalek Hassan	G'rate ORDEV maint. Engineer
Mr. Nigel Nicholson	Environment Engineering Advisor, Chemonics
Engr. Ayman Abdel-Wahab	Water Engineering Advisor, Chemonics
Engr. Omar Kamel El-Azhari	ORDEV Cairo Planning Dept.

During the meeting, the following subjects were discussed:

1. Chemonics team briefed the Secretary General on the System Loss Reduction Program (SLRP) and explained to him the selection criteria for villages, and benefits of the program regarding field training, health and reduction in water loss.

The Secretary General and the governorate maintenance coordinator proposed selecting Mahallet Marhoum V/C (Markaz Tanta) instead of Nahtai V/C (Markaz Zefta) which Chemonics proposed. Engr. Aly claimed that although the BVS investment in water projects in Mahallet Marhoum is not as high as Nahtai, this might mean that the network in the first village is tending to have more problems regarding water loss.

Chemonics team explained that selecting villages of higher BVS investment in water projects is an obligation according to the USAID agreement.

2. The Secretary General appointed Engr. Aiy Gharib Ads (the governorate maintenance coordinator) as the program counterpart engineer (CFE). Engr. Mohamed Abdel-Monem Genawi (Markaz Tanta maintenance engineer) will be assisting the (CFE).
3. It was emphasized that governorate/village input for the (SLRP) will include financing the installation of bulk meters and valves, the repair of defects and the collection of data. Chemonics contribution consists of two advisors: Mr. Nigel Nicholson (environment engineering advisor) and Engr. Ayman Abdel-Wahab (water engineering advisor) to reduce losses in the selected village.
4. It was agreed that the (CFE) will prepare full details about BVS investment in water projects for both Nahta and Mahallet Marhoum VDCs for the final selection.

The meeting ended at 11:30 A.M.

cc: File
EEG file
Dr Ahmad Gaber
Nigel Nicholson
General Mohamed Ibrahim El-Toukhi, Secretary General,
Gharbiya

MEETING MINUTE

Date: 31st August 1988

Place: Menufiya Secretary General's Office
Date: 30th August 1988
Subject: Introduction to System Loss Reduction Program (S.L.R.P.)

The meeting began at 10:10 a.m.

Present:

Mr. Yassin Hafez	Secretary General
Mr. Mohamed Gab-Allan	G'rate ORDEV Director
Engr. Mohamed Sabri Abu-Omar	Housing Dept. Mechanics Manager
Engr. Gamal Abdel-Hamied El-Kafrawi	Housing Dept. Water Network Chief
Mr. Nigel Nicholson	Environment Engineering Advisor, Chemonics
Engr. Ayman Abdel-Wahab	Water Engineering Advisor, Chemonics
Engr. Omar Kamel El-Azhari	ORDEV Cairo Planning Dept.

During the meeting, the following subjects were discussed:

1. Chemonics team briefed the Secretary General on the System Loss Reduction Program (SLRP) and explained to him the selection criteria for villages, and benefits of the program regarding field training, health, and reduction in water losses.
2. The Secretary General appointed Engr. Mohamed Sabri Abu-Omar as counterpart engineer to Chemonics staff in the program.
3. The Secretary General enquired about the estimated cost for implementing the program, the team explained that it is not possible to estimate the cost before knowing the network regarding diameters, length and condition. It was agreed to provide the Secretary General with an estimate after studying the network.
4. Engr. Mohamed Sabri (CFE) suggested changing the village selection to Shobraikhom V/C instead of Abnahs V/C (both in Markaz Quesna), due to having high groundwater table problem in Shobraikhom. The team explained that high groundwater level and water loss are different problems.

5. It was emphasized that governorate/village inputs for the GLEP will include financing the installation of bulk meters and valves, the repair of defects and the collection of data. Chemonics contribution consists of two advisors responsible for reducing losses in the selected village.

The meeting ended at 11:30 A.M.

cc: File
EEG file
Dr. Ahmad Gaber
Nigel Nicholson
General Mohamed Ibrahim El-Toukhi, Secretary General,
Gharbiya

APPENDIX-C
EXTRACTS OF
1988-89 ANNUAL WORK PLAN:
TASKS G.5 (i); (ii) AND (iii)

LD II-P Annual MURPLAN SCHEDULE (1 OCTOBER '88 - 30 SEPTEMBER '89)

	OCT '88	NOV '88	DEC '88	JAN '89	FEB '89	MAR '89	APR '89	MAY '89	JUN '89	JUL '89	AUG '89	SEP '89
I. STUDIES, EVALUATIONS, AND DATA COLLECTION & MGMT												
A. BASELINE AND EVALUATION												
b1 LD II-P Planning process evaluation												
c1 Baseline - Implementation												
k3 Pilot BM evaluation												
b2 IS operations evaluation												
g1 Baseline - Current BM capacity												
d3 Cash management performance												
g3 Alternatives to BM												
g6 Disposal of inseparable property												
B. MIS, SURVEYS & DATA COLLECTION												
b2 Data collection for inv. plan & rec. costs												
f2 Data collection for BM												
g8 Data collection for BM												
e4 M/M info clearing house												
g7 Tracking system for services interruption												
g5a. Water system loss survey												
g8 Cardex (F4)												
d1a PC installation												
d1a Upgrade software												
d2 Financial reporting												
II. TRAINING												
A. ANNUAL ORIENTATION												
Guidelines												
PLNC & MSAB approval												
TBI												
Village workshops												
Governorate level workshops												
B. ADM'D SEMINARS FOR MANAGERS												
b1 Project planning seminars												
c2 Project implementation seminars												
b3 A&E feasibility studies training												
d1iv MIS for decision makers												
i1 DM planning seminars												
q2 Infrastructure BM training												
Preparation Seminars												

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	OCT '88	NOV '88	DEC '88	JAN '89	FEB '89	MAR '89	APR '89	MAY '89	JUN '89	JUL '89	AUG '89	SEP '89
C. TECHNICAL SKILLS TRAINING												
01 O&M training courses												
Smith Sinai O&M plan												
Compl. of O&M plans (TOI) 13-Gov.'atlas												
Markaz Workshops in O&M												
O&M Multi-year plan:												
Preparation												
TOI program												
02 O&M Technical Training:												
c2a/g6 Technical training: Roads sector												
c2b Technical training: Buildings sector												
e1 Construction supervision training (AMU)												
e2 O&M for 20 Prinds												
g5a1 Develop expertise in water loss reduction												
d1a1 Microcomputer Training												
D. SUPPORT FOR GOVERNORATE TRAINING OFFICES												
01 Support for Governorate Training Offices												
III. TA IN PLANNING, IMPL'N, & O&M												
A. Planning												
04 TA in investment planning												
05 TA in O&M feasibility studies												
06 TA in O&M feasibility studies												
B. Implementation												
01 TA in O&M project supervision												
03 TA in project implementation (incl. g6)												
03b TA in implementation meetings												
C. O&M												
03 TA in O&M planning												
02 TA in O&M system implementation												
05 TA in water system O&M planning												

Deliverables code:

- R = Report
- S = Study
- M = Manual
- T = completion of training program / course
- I = Installation

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Task g5(i) WATER SYSTEMS MAINTENANCE PLAN

=====

Purpose: To assist governorate engineers implement effective operating and maintenance programs for water systems.

Output: Improvement in the standards of water systems maintenance plans required for application in future local development projects.

Strategy: Identical strategy applies to the three sub-tasks g5(i), (ii), and (iii). This is:

1. Five pilot villages (in five governorates) will be selected to provide hands-on training to governorate, markaz, and village counterpart staff;
2. The pilot village experiences will be extended throughout the pilot governorates and eventually other governorates;
3. Chemonics-trained ORDEV counterparts will be expected to replicate the program to other governorates;
4. It is proposed that undergraduate engineers be involved in the program;
5. Sakkara village will be one of the selected pilot villages so that hands-on experience can be incorporated into courses held at the Sakkara Training Center;
6. EEG will closely liase with the O&M group of Chemonics.

Constraints: Limited existing training capacity; lack of records in the villages.

Steps:

1. Select five pilot villages to receive TA in Water System O&M.

Target Date: October 1988

2. Collect baseline data from the pilot villages and

=====

Task g5(ii) WATER SYSTEM LOSS SURVEY AND O&M ASSESSMENT

=====

Purpose: To improve O&M procedures such that losses are minimized and there is improvement in the efficiency of water systems.

Output: Guidelines developed from experiences in 5 pilot villages which will focus on improving the efficiency of water systems.

Strategy: Identical strategy applies to the three sub-tasks g5(i), (ii), and (iii). That is:

1. Five pilot villages (in five governorates) will be selected to provide hands-on training to governorate, markaz, and village counterpart staff;
2. The pilot village experiences will be extended throughout the pilot governorates and eventually other governorates;
3. Chemonics-trained ORDEV counterparts will be expected to replicate the program to other governorates;
4. It is proposed undergraduate engineers be involved in the program;
5. Sakkara will be one of the selected pilot villages so direct experience can be incorporated into courses held at the Sakkara Training Center;
6. EEG will closely liaise with the O&M group of Chemonics.

Constraints: 1.) Lack of equipment for flow monitoring/recording; and, 2.) lack of records in the villages.

Steps:

1. Select five pilot villages to receive TA in Water System O&M.

Target Date: 31 October 1988

2. Collect baseline data from the pilot villages and develop a work program. A start-up report will be developed.

Target Date: 30 November 1988

3. Develop an appropriate Water Loss Reduction System for village water supply systems.

Deliverable: Report on Water Loss Reduction for village water supply systems.

Target Date: 30 June 1989

4. Develop reports on water system loss reduction activity in each village.

Target Date: September 1989

Level of effort (in person/weeks):

Task Coordinator:	N. Nicholson
LT Professional Staff:	62
ST Expats:	8
ST Local:	12

=====

**Task g5(iii) DEVELOP LOCAL PUBLIC AND PRIVATE SECTOR
EXPERTISE IN WATER LEAK DETECTION AND WATER
SYSTEM O&M ASSESSMENT**

=====

Purpose: To train governorate personnel in conducting assessment of water system O&M, implement water loss reduction programs and to prepare water system annual maintenance plans.

Outputs: 1.) Training guidelines; 2.) trained counterpart personnel; and, 3.) assessment of the need for any private sector input.

Strategy: Identical strategy applies to the three sub-tasks g5(i), (ii), and (iii). This is:

1. Five pilot villages (in five governorates) will be selected to provide hands-on training to governorate, markaz, and village counterpart staff;
2. The pilot village experiences will be extended throughout the pilot governorates and eventually other governorates;
3. Chemonics-trained ORDEV counterparts will be expected to replicate the program to other governorates;
4. Sakkara will be one of the selected pilot villages so direct experience can be incorporated into courses held at the Sakkara Training Center;
5. EEG will closely liase with the O&M group of Chemonics.
6. The outputs of this activity will be the basis for a strategy of training and technical assistance for private sector involvement.

Constraints: Lack of incentive by governorate engineers to undertake additional work, due to Government salary structure; difficulty in motivating private sector firms to second staff for training programs.

Steps:

1. Using the results from Tasks g5(i) and g5(ii), prepare a Draft Manual titled "Improving O&M for Water Systems" and workshop to refine the guidelines. Workshop participants will be counterpart staff.

Deliverable: First workshop. Approx 30 persons trained.

Target Date: 30 June 1989

2. Revise first draft manual and modify workshop guidelines based on the results obtained from the first workshop. Develop second draft of manual.

Deliverable: Second workshop. Approx. 30 persons trained.

Target Date: 31 August 1989

3. Prepare Final Manual

Target Date: 30 September 1989

Level of effort (in person/weeks):

Task Coordinator:	N. Nicholson
LT Professional Staff:	62
ST Expats:	8
ST Local:	12

APPENDIX-D

LETTER TO ORDEV GIVING DETAILS OF
UPGRADING O&M OF VILLAGE WATER SYSTEMS

APPENDIX - D

6th November, 1988.

REF: 770/

Professor Abdel Rasoul,
Chairman,
ORDEV.

Dear Professor Abdel Rasoul,

LD II (P) PROJECT: UPGRADING O&M OF VILLAGE WATER SYSTEMS

This is in response to your letter dated 19th October 1988 asking for details about the above program.

The work that will be performed by Chemonics responds to the USAID contract Task g.5 "Upgrading Maintenance of Village Water Systems". This Task is sub-divided as follows -

- g.5.i. "Water System Maintenance Plans" calls for assistance to the governorates in preparing annual maintenance plans for village water systems.
- g.5.ii. "Water System Leak Survey and O&M Assessment" calls for a water system leak survey and an O&M assessment in at least five villages.
- g.5.iii. "Develop local public and private sector expertise in water leak detection and water system O&M assessment" calls for training private sector and governorate staff. The contract states at least five governorate engineers in at least five provincial governorates have to be trained in leak detection and O&M assessment.

Chemonics proposes addressing these tasks by working in five selected pilot villages with counterpart engineers from ORDEV, and each governorate, markaz and village. The counterparts will gain hands on experience in improving water systems' O&M and reducing losses. In addition a set of Guidelines will record the lessons learnt from the five pilot villages.

Before September 1989, the Guidelines will be refined through two workshops with counterparts and other personnel from the governorates of the five pilot village. These guidelines will be used to structure training courses in water loss reduction and O&M improvements for candidates from the remaining governorates.

Mr Shair of ORDEV, and WHO agreed to the selection of the pilot villages as recorded by the enclosed meeting minutes. USAID also concur with the selection.

By mutual agreement with ORDEV and WHO, Chemonics will work in different governorates from those selected for the WHO leak detection program, with the exception of Giza Governorate where there are good reasons for both consultants to work in the same governorate. Training using the Sakkara Training Center in Giza Governorate will be needed to spread the lessons learnt from the pilot village study and the WHO program. By selecting Sakkara as one of the pilot villages, candidates attending water loss reduction courses at the Training Center can benefit from practical experiences. This idea has been accepted by all parties.

A second enclosure is a copy of the strategy and proposed work plan for each of the three sub-tasks g.5.1,ii and iii as described in the Annual Work Plan. The first deliverable is a Start Up report which will contain full details of the village selection process, the work plan, and data logging equipment which will greatly accelerate collection of flow rates and pressures in the pipe network.

Should you require further information about the proposed program of upgrading the O&M of village water systems we are willing to verbally address your committee on our work plan.

Yours sincerely,

C.D Ward
Chief of Party.

APPENDIX-E

BILL OF QUANTITIES AND COST ESTIMATE
FOR WATER LOSS MONITORING EQUIPMENT

APPENDIX - E

LDII (P) PROJECT
 Bill of Quantities and Estimate
 Water Loss Monitoring Equipment

Date: 11 September 1988

ITEM No.	DESCRIPTION	Qty	Units	Est. Amount \$	Est. Total \$
<u>Equipment</u>					
1.	Inferential water meters with magnetic drive-100mm	10	No	948	9,480
2.	As Item 1 - 80 mm	5	No.	556	2,780
3.	Pulse counter units for mounting on items 1 & 2	15	No.	160	2,400
4.	Pressure transducers with 4-20mA output and self-contained power packs.	30	No.	600	18,000
5.	WACO model 4000 Data logger units, including LEMO plug	5	No	2,670	13,350
6.	As item 5 model 3000 fitted with LEMO plug and analogue entry	5	No	1,915	9,575
7.	Add 30% CIF charges for items 1 to 6	Lump sum			16,675
8.	Add 5% contingencies	Lump sum			<u>3,600</u>
Equipment sub-total.					\$75,873

50

ITEM No.	DESCRIPTION	Qty	Units	Est. Amount	Est. Total
				\$	\$

Installation:

9.	Labour and fittings to install water meters (including manholes)	15	No	500	7,500
10.	As item 9 for pressure transducers	30	No	400	12,000
	Add 10% contingencies				<u>1,950</u>
	Installation sub-total				21,450
	GRAND TOTAL:.....			say \$	97,500 =====

Notes:

- Items 1 to 3 are priced on FOB quotes from Kent Meters USA.
- Items 4 is an estimate. A USA quote has been requested.
- Items 5 and 6 are priced on quotes from Gutterman Messtechnik, Switzerland. CDM Boston are enquiring about comfortable State side equipment.
- The conversion rate used is \$1 = SFr 1.44
- The meters and transducers will be permanently installed during pilot studies, whilst the data loggers will be moved between systems.

REFERENCES

1. USAID Contract No 263-0182-C-00-8041-00 dated 23 February 1988 awarded to Chemonics International Consulting Division for services to the Government of Egypt for the United States Agency for International Development to implement the provincial component of the Local Development II program.
2. 1988-1989 Annual Work Plan for USAID Contract No 263-0182-C-00-8041-00 dated October 1988 and prepared by Chemonics/Cairo.
3. "Provincial Water Supplies Project", prepared by Binnie-Taylor and Dr. Abdel-Warith, dated February 1980.
4. "Water Supply and Sanitary Drainage for Qena and Aswan Governorates" prepared by Upper Egypt Consultants, dated June 1987.
5. "Assessment of Village Water Systems in Egypt", prepared by Water and Sanitation for Health project for USAID: Office of Local Administration and Development; and Organization for Reconstruction and Development of the Egyptian Village dated March 1988.