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ARAB REPUBLIC OF  
EGYPT

NATIONAL ORGANIZATION FOR  
POTABLE WATER AND  
SANITARY DRAINAGE

SUEZ CANAL  
AUTHORITY

**CANAL CITIES WATER AND WASTEWATER  
PHASE II PROJECT  
MASTER PLAN**

USAID CONTRACT No. 263-C-00-98-00052-00  
USAID PROJECT No. 263-0174

**VOLUME 7  
INSTITUTIONAL & FINANCIAL  
REPORT**

September 1999

BLACK & VEATCH INTERNATIONAL

In association with

MONTGOMERY WATSON

SABBOUR ASSOCIATES

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PORT SAID

ISMAILIA

SUEZ

PN-AEJ-033  
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SABBOUR ASSOCIATES

Canal Cities Water & Wastewater Master Plans  
USAID Contract No. 263-C-00-98-00052-00  
USAID Project No. 263-0174-3-94145

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30 September 1999

United States Agency for International Development (USAID)  
Zahraa El Maadi  
Maadi, Cairo, Egypt

Subject: Canal Cities Water & Wastewater Master Plans

Ladies and Gentlemen:

Black & Veatch International, in association with Montgomery Watson Americas and Sabbour Associates, is pleased to submit three copies of the Canal Cities Water and Wastewater Master Plans. The Master Plan documents consist of eight volumes, as listed below.

- Executive Summary
- Volume 1 – Suez Water Master Plan
- Volume 2 – Suez Wastewater Master Plan
- Volume 3 – Ismailia Water Master Plan
- Volume 4 – Ismailia Wastewater Master Plan
- Volume 5 – Port Said Water Master Plan
- Volume 6 – Port Said Wastewater Master Plan
- Volume 7 – Institutional and Financial Report

Concurrently, we are submitting three copies of the Master Plans to the National Organization for Potable Water and Sanitary Drainage (NOPWASD), one copy to the Suez Canal Authority (SCA), and one copy each to the Governorates of Suez, Ismailia, and Port Said.

This project represents an important achievement in USAID's continuing program to provide sustainable water and wastewater infrastructure in Egypt. We trust that the recommendations presented in the Master Plans will result in a well conceived and manageable program for NOPWASD and SCA as they prepare for development and growth in Suez, Ismailia, and Port Said.

It has been a pleasure working with USAID and we look forward to the next opportunity to be of service.



Very truly yours,  
BLACK & VEATCH INTERNATIONAL

Rick L. Zila, P.E.  
Project Director

Canal Cities Master Plan Office  
1 El Mahata Square - Ma'adi Palace - Ma'adi - Cairo - Egypt  
Tel: 351-5343 / 375-0800 / 350-6030 Fax: 378-6668

Black & Veatch International - Kansas City, Missouri  
Tel: (913) 458-2000 Fax: (913) 458-3730

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### USAID

Mr. William Reynolds	Contracting Officer
Mr. Herbert Feldt	Contracting Officer's Technical Representative
Ms. Noha El-Maraghy	Project Officer
Mr. Medhat Wissa	Project Officer
Mr. Samy Aboul Farag	Procurement Officer

### NOPWASD

Eng. Mahmoud Kamal Al Sarnagawy	Chairman
Eng. Mostafa Mohamed Sharaf	Deputy Chairman
Eng. Samira Nikola	Head, Project Implementation Unit
Eng. Samir Swaid	Ex-Head, Executive Agency for Canal Cities
Eng. Ibrahim Mostafa	Head, Executive Agency for Canal Cities
Eng. Adnan Abd El-Gelil	General Executive Manager, Port Said
Eng. Samir Awad El-Refai	Executive Manager, Ismailia
Eng. Gamal Botairus	Executive Manager, Suez

### SCA

Eng. Nabil Lotfy	Director, Civil Works Department
Eng. Mohamed Abdallah	Deputy Director, Civil Works Department
Eng. Yasser Hammad	Head, Information Center
Mr. Adel Abo El-Fotouh	Director, Financial Department

### SCA Suez Office

Eng. Mohamed Fouad	Head, Water Sector
Eng. Hassan Othman	Manager, Water Treatment Plant
Eng. Sayed Abd El-Wahed	Manager, Water Network
Eng. Tamer M. Adel	Computer Engineer, Water Network Dept
Eng. Talaat Abou El-Fotouh	Water Treatment Plant / O&M
Eng. Said Dawoud	O&M Contract Manager, WWTP
Eng. Abd El Kader Radwan	Ex-Manager, WWTP
Eng. Mahmoud Nasr	Manager, WWTP

## ACKNOWLEDGMENTS, (continued)

---

Mr. Tarek El-Sayyed

Chemist, WWTP

### **SCA Ismailia Office**

Eng. Emad Abd El-Meseih

Head, Water Sector

Eng. Abd El Rahman El-Zobeir

Manager, Water Treatment Plant

Eng. Abd El-Nabi Emam

Manager, Water Network

Eng. Ahmed Herek

Water Treatment / O&M Plant

Eng. Ahmed Ali Fakhri

Water Network Department

Eng. Mohamed Basyouni

Water Treatment / O&M Plant

Eng. Ateyya A. El-Megid

Manager, WWTP

Eng. Essam El-Din Ibrahim

O&M Contract Manager, WWTP

### **SCA Port Said Office**

Eng. Saleh Khalifa Saleh

Head, Water Sector

Eng. Medhat Foda

Manager, Water Treatment Plant

Eng. Hani El-Desoki

Manager, Water Network

Eng. Hosam El-Tarabily

Computer Engineer, Water Network

Eng. Mohamed El-Sayyad

Water Treatment Plant / O&M

Eng. Osama Shaker

Water Network Department

Eng. Ahmed Saleh

O&M Contract Manager, WWTP

Eng. Said Farhan

Manager, WWTP

### **Suez Governorate**

Gen. Mohsen Sadek

Secretary General

Gen. Hamid Fares

Governor's Office Manager

Eng. Said El-Zagaziki

General Manager, Water and Sanitary Drainage

Eng. Monamed Hamdy

Director, Planning and Physical Development

Eng. Ismail Orabi

Manager, Sanitary Drainage Dept.

Eng. Abdel Hakim Tawfik

General Director, Housing

### **Ismailia Governorate**

Mr. Hany El Kosiefy

Secretary General

Mr. Abd El-Kareem Baghdady

Assistant Secretary General

Eng. Mohamed Mahmoud

General Director, Sanitary Drainage

Eng. Ibrahim Nasr-Alla

General Director, Housing

## ACKNOWLEDGMENTS, (continued)

---

### Port Said Governorate

Mr. Hassan El-Morsy	Secretary General
Gen. M. El-Husseiny Hattab	Ex Secretary General
Eng. Mosaad Soliman	General Director, Sanitary Drainage
Eng. Basiouni Abd El-Warith	General Director, Housing
Eng. Abd El-Fattah A. El-Aaty	General Director, Physical Planning

### GOPP

Eng. Hussein El-Gibaly	Chairman
Eng. Hashem Hashem	General Director, GOPP 3rd Region
Eng. Abd El-Monem Ayyoub	National Director, 3rd Region
Eng. Ashraf Hashem	3 <sup>rd</sup> Region

### Ministry of Irrigation

Eng. Hussein Ehsan El-Atfy	Manager, Central Administration for the Minister Affairs Office
Eng. Hussein Elwan	Manager, Department for Water Distribution
Eng. Farag El-Yamany	Manager, Department for Water Distribution, Canal Cities Govenorates
Dr. Soud El-Khafif	Consultant, Minister of Irrigation

### Central Agency of Reconstruction

Gen. Fathy Kozman	Chairman
-------------------	----------

### New Communities Authority

Gen. Mahmoud El-Shafey	Chairman
------------------------	----------

### CAPMAS

Mr. Ihab Elwy	Chairman
Brigadier Moustafa Mohamed Ahmed	Head, Central Administration for Software Programs

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In 1998 the United States Agency for International Development (USAID) contracted with Black & Veatch International (BVI) to prepare water and wastewater master plans for the three Canal Cities. The purpose of these master plans is to guide utility infrastructure development up to the year 2020. The master plan study also included a brief review (2 person-months) to review institutional and financial work done by Metcalf & Eddy in 1996. Volume 7 of the Master Plan contains the results of the institutional and financial review.

Black & Veatch International, in association with Montgomery Watson Americas and Sabbour Associates, conducted the Canal Cities Master Plan project during the period from June 1998 to September 1999. Heath Consultants, a firm specializing in field investigations for water systems, conducted field surveys and training for leak detection, system pressures, and flow measurement during the project

The following personnel of Black & Veatch International and its associated firms have contributed to this Master Plan.

### Canal Cities Master Plan Project-Resident Team

Mr. Rick Zila	Project Director
Gen. Mohammed Al-Wardany	Deputy Project Director
Mr. Brent Hauser	Senior Wastewater Engineer
Mr. Mario Dimzon	Senior Water Engineer
Mr. Robert Kirkman	Mapping & Information Manager
Mr. Naguib Amin	Land Use Planner
Mr. Mohammed El-Zawawy	Manager, Administrative & Financial
Mr. Tarek Hassanien	Field Engineer
Mr. Tarek Hafez	Computer and Mapping Engineer
Mr. Hesham Mohammed	Asst. Administrative & Financial
Ms. Rasha Elwan	Chief Administrative Secretary
Ms. Samia El-Sherif	Senior Secretary / Chief Secretary

### Black & Veatch International – Home Office

Mr. Ronald Zitterkopf	Principal-in-Charge
Mr. David Howe	Quality Control Manager
Ms. Peggy Howe	Institutional & Financial Planner
Ms. Rebecca Schrader	Computer / Billing Specialist
Mr. Jim Henson	Sr. Wastewater Treatment Specialist
Mr. Tim Tougas	Wastewater Engineer
Mr. Mike Agbodo	Wastewater System Model Engineer

## ACKNOWLEDGMENTS, (continued)

---

### Montgomery Watson – Home Office

Mr. Harry Blohm	Project Administrator
Mr. Te-Ling Chou	Home Office Project Coordinator
Mr. Mark Ysusi	Water System Model Engineer
Ms. Karen Johnson	Land Use Planner
Mr. Bruce Chow	Sr. Water Treatment Specialist
Mr. Terry Hoepfer	Senior Water Consultant
Mr. Hector Arias	Cost Estimator

### Sabbour Associates - Home Office

Eng. Assad A. El-Fattah Nafea	Project Administrator
Eng. Abd El-Aziz Ezzat	Technical Assistant
Mr. Gamal Sabbour	Administrative and Financial Assistant

### Heath Consultants

Mr. Jim Dawson	Leak Detection Specialist / Trainer
Mr. John Meritt	Leak Detection Specialist / Trainer
Mr. John Reinhard	Leak Detection Specialist / Trainer
Mr. Don Keller	Leak Detection Specialist / Trainer

# Executive Summary

## Introduction

Institutional strengthening is a dynamic process driven by the changing service objectives of the Canal Cities' water and wastewater utilities. As new challenges arise, the organization of a utility and the methods of performance improvement must change accordingly. However, to successfully manage change, the Canal Cities utilities must take the following actions:

- Identify programs for improvement.
- Establish procedures for implementing change with operational performance targets and an action plan for achieving benchmarks.
- Reorganize their institutional structure to support needed changes.

A financial system capable of providing resources needed to implement changes is critical to supporting institutional changes. The institutional and financial review presented in this Master Plan identifies and recommends changes that will strengthen the institutional aspects of the utilities.

## Performance Improvement Programs

Utility staff, under the guidance of an external consultant, should develop sustainable performance improvement programs. This methodology was considered by project participants; however, because of time constraints, it was decided that the existing scope of work would identify and describe potential programs and provide a corresponding action plan for implementation. Development of comprehensive programs, which would include the following, should be done under separate work plans.

- Identifying current industry standards and their characteristics for performance.
- Identifying ultimate targets for the utility and setting benchmarks for achieving the targeted improvements.
- Defining the structure, staff, and systems needed to reach targets and benchmarks.
- Identifying the resources needed for improvements.
- Developing action plans with monthly, quarterly, and annual deliverables.
- Developing performance monitoring plans to track achievement of benchmarks and implementation of action plans.

The following performance improvement programs, which would move the utilities towards autonomy and financial independence, were identified.

## Revenue Collections

Revenue billing and the corresponding collections are the responsibility of the SCA and the respective water utility. Increasing revenue collections is a function of increasing the billed revenue from current users and improving the corresponding collection. Therefore, improvements in revenue collections are directly related to the elements that make up a bill; i.e., legally connected account, use, customer classification, and application of the tariff. Performance improvement programs, which address these elements and can directly impact the revenue collection, include the following:

- **Billable Use** - confirming proper use is being billed.
- **Water Service Connection Audit** - confirming that all legal connections are included in the billing data base.
- **Classification Verification** - confirming that customers are properly classified.
- **Illegal Connections** - identifying and processing illegally connected users.
- **Arrears** - addressing accounts which are in arrears or default in a timely fashion.

Improvements in the water utility's collection of revenue will directly impact the wastewater revenues, as wastewater is a surcharge to billable water.

## Revenue Control

Improvements in the control of revenues must be addressed both externally (macro level) and internally (micro level). External agencies, SCA for the water utilities and SCA and the Governorates for the wastewater utilities, currently control the revenues of the utilities. Prior to increasing their involvement in revenue control, each utility must prepare its organization to assume such responsibilities. Once the utility has the financial expertise needed to increase its revenue control, regular budgeting, accounting, and reporting activities will provide the justification for moving control of the revenues from the external agencies to the utilities.

## Customer Education

Detailed community education programs pertaining to water conservation, wastewater influent control, public health, water-borne diseases, and disposal of hazardous wastes were developed and implemented under the Canal Cities Phase II Technical Assistance Project. Performance improvement programs for education of the customer on the need to pay for water and wastewater services and to make utilities self-sustaining should build on the successes of that program. New printed material addressing the financial status of the utilities could be distributed to end-users. Likewise, the curriculum for grade school children could be expanded to include financial matters.

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## Setting User Charges

Under the current system, the water utilities are not encouraged to independently request or suggest the need to increase user charges. Expenditures are approved based on operational needs and are independent of the amount of revenue billed or collected by the water utility. The determination of justifiable and adequate tariffs or user charges requires appropriate financial documentation. Information collected by a financial department within each Utility could provide the basis for calculating user charges. The utility cost of service and tariff design model for Suez developed under the Canal Cities Phase II Technical Assistance Project should be updated annually to provide the documentation and justification needed to increase user charges. Similar tariff models should be developed for the other two cities.

<b>Recommendations</b>
<b>Performance Improvement Programs</b>
<ul style="list-style-type: none"><li>• Develop, internally, comprehensive improvement programs, as defined above, for revenue collection, revenue control, customer education, and user charges.</li></ul>
<ul style="list-style-type: none"><li>• Provide financial expertise within each utility.</li></ul>
<ul style="list-style-type: none"><li>• Update or create financial models and implement needed tariff adjustments.</li></ul>

## Organizational Structure

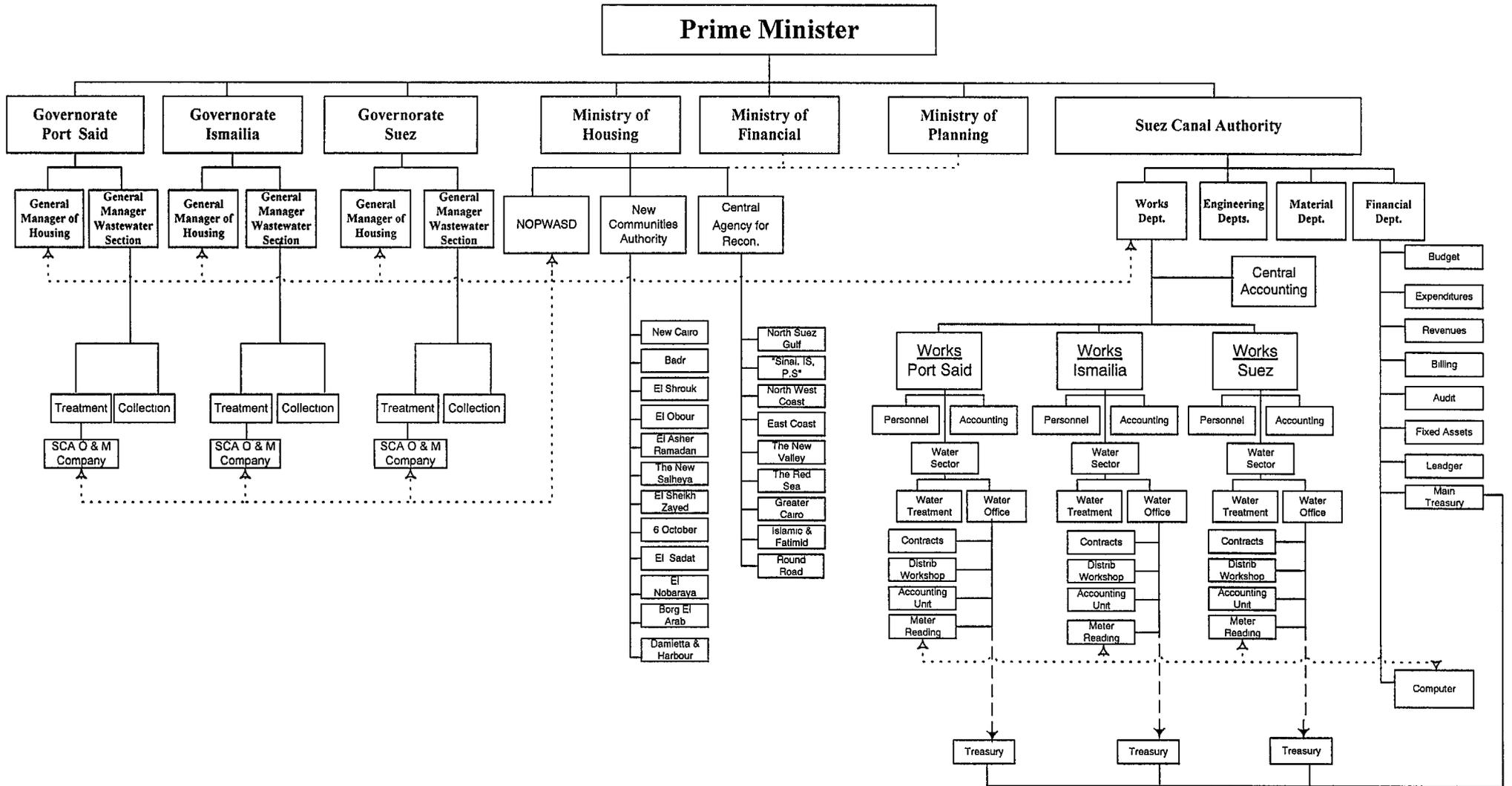
The purpose of reviewing the present organizational structure of the water and wastewater utilities for the Canal Cities is to identify and develop programs for restructuring existing systems which will facilitate autonomy and financial independence of the utilities and support the proposed performance improvement programs.

### Existing Systems

The water and wastewater utilities of Suez, Ismailia, and Port Said are separate entities. The water utilities are under the control of the SCA. The wastewater utilities report to the Governor of their respective areas. NOPWASD provides planning and technical guidance for the wastewater utilities. The relationship between the utilities, the governorates, and the SCA is illustrated in Figure V7-ES.1

# Organizational Structure

## Canal Cities Water and Wastewater Utilities



ARAB REPUBLIC OF EGYPT  
**SUEZ CANAL AUTHORITY**  
 NATIONAL ORGANIZATION FOR  
 POTABLE WATER AND SANITARY DRAINAGE

USAID  
 CANAL CITIES  
 WATER AND WASTEWATER  
 MASTER PLAN

**ORGANIZATIONAL STRUCTURE**  
 Canal Cities Water and Wastewater Utilities

BLACK & VEATCH INTERNATIONAL  
 in association with  
 MONTGOMERY WATSON      SABBOUR ASSOCIATES

Date: September 1999

Figure: V7-ES.1

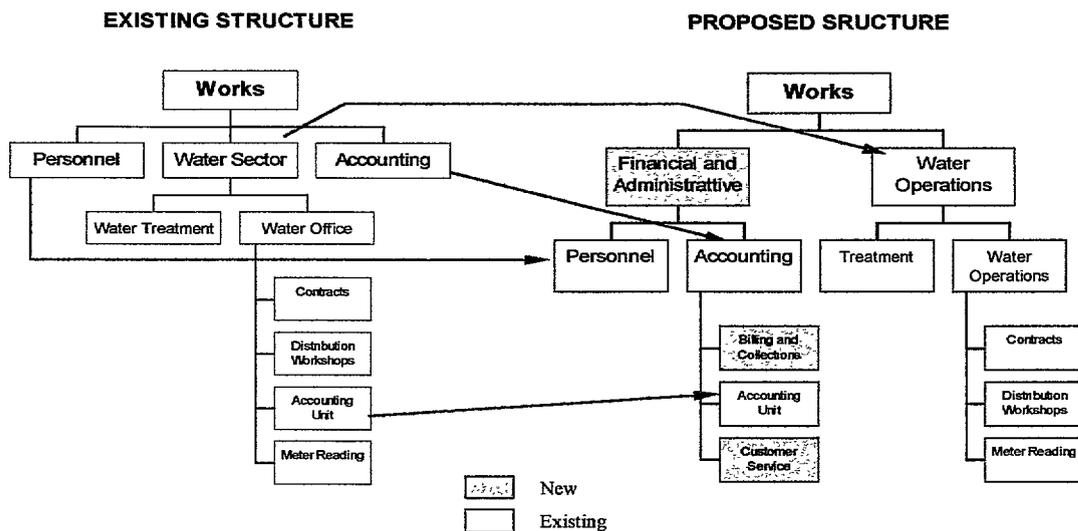
## Proposed Changes

Current national policies suggest a movement towards combining a community's existing water and wastewater utilities into a single entity. However, this study focuses on internal improvements within the existing utility organizations that can be implemented in the short term.

Decentralized financial and administrative departments are recommended for each water utility. These departments would be responsible for the revenue and expenditure related activities at their respective utility. By combining revenue and expenditure functions in one department, cash flow analysis can be performed on a regular basis, providing senior management with the financial data needed to make informed decisions about tariff adjustments, expenditure requests, and capital needs.

A comparison of the existing and proposed organizational structure for a Canal Cities' waterworks is shown in Figure V7-ES.2.

**Figure V7-ES.2 Alternative Organizational Structure for Canal Cities Water Utility**



<b>Recommendations</b>	
<b>Reorganization</b>	
•	Decentralize financial activities of the utilities.
•	Provide financial expertise within each utility.

## **Action Plan**

The purpose of an action plan is to organize the steps needed to logically implement changes, to quantify time requirements for implementing the changes, and to identify the parties responsible for managing the change.

### **Implementation of Changes**

Comprehensive, internally developed performance improvement programs would consist of action plans, including assignment of responsibility for implementation. External consultants cannot effectively assign this responsibility. The implementation schedule presented in Figure V7-ES.3 provides the framework for an internally developed comprehensive action plan.

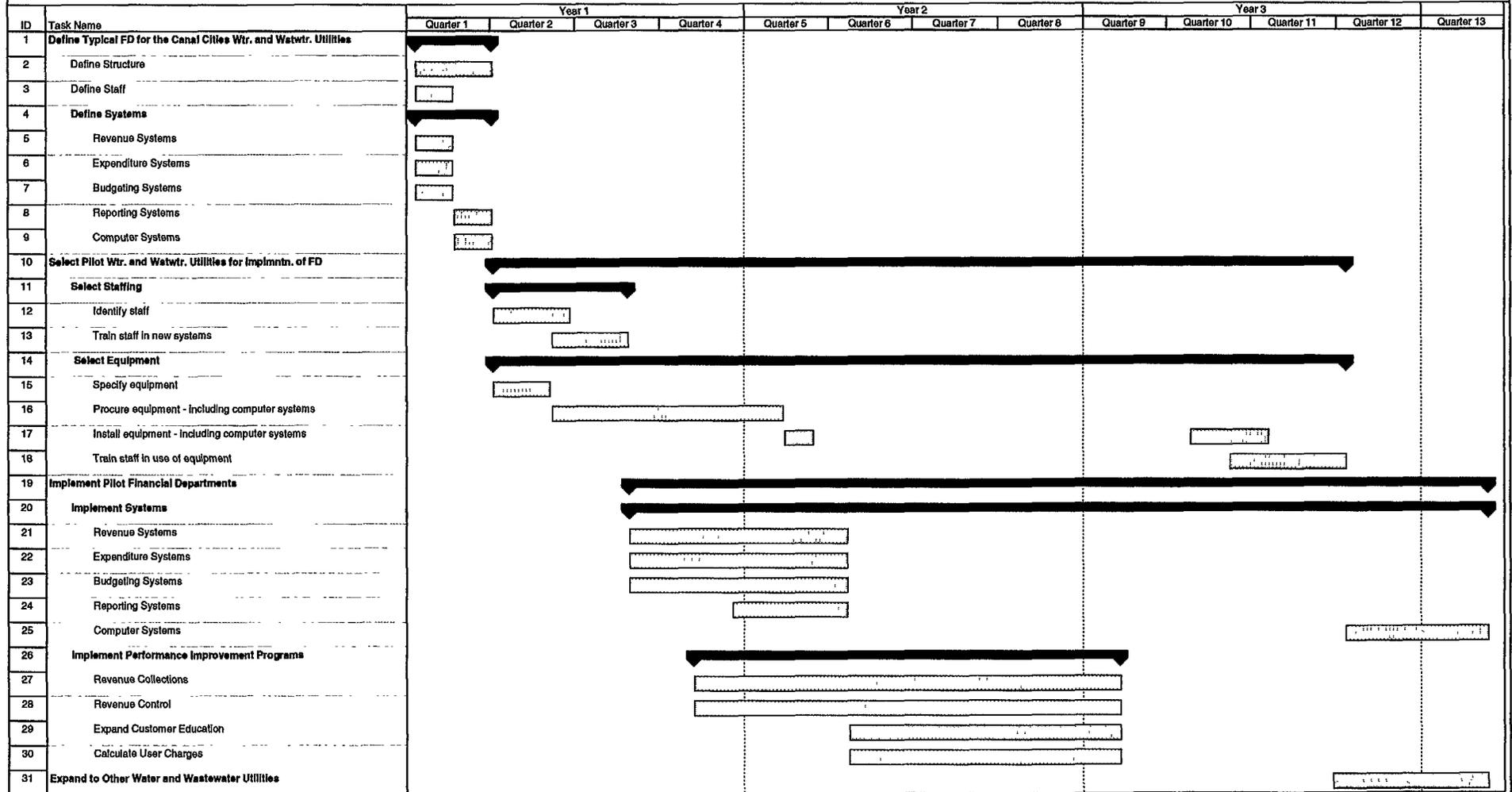
Institutional change is a long-term commitment. In order to achieve sustainable change, the foundation for such change must be in place and must be supported by senior management and staff. As indicated in the schedule for implementing the action plan, the first nine to twelve months focus on organizational changes and defining and adopting new systems. Only after the systems have been approved can they be implemented and effective changes realized. Implementation of the systems and the corresponding performance improvement programs are scheduled for the second portion of the plan.

### **Performance Measures**

Changes proposed in any performance improvement program are theoretical until they are implemented. Once implementation begins, the effectiveness of the changes can be monitored by performance indicators. Improvement in performance indicators reinforces the performance improvement programs. Either no change or a negative change in a performance indicator signals the need for modifying the improvement program.

Samples of potential performance indicators for the programs identified in the Performance Improvement Programs section, are summarized in the following table.

## Schedule for Implementation of Action Plan



Task [ ] Summary [ ]

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**Table V7-ES.1 Potential Performance Measurements for Proposed Performance Improvement Programs**

Performance Program	Performance Indicator	Target or Benchmark
Revenue Collections		
✓ Billable Use	• Number of bills with estimated use / Number of bills	• Less than 10 percent
	• Billable use / Production	• 75 to 80 percent
	• Use based on meter reads / Total use billed	• Greater than 90 percent
	• Number of working meters / Total meters installed	• 100 percent
	• Meters calibrated / Total meters	• 100 percent
✓ Connections Audit	• Number of customer contracts / Number of billable accounts	• 100 percent
	• Number of new accounts included in billing system in less than 2 months / Total number of new accounts	• 100 percent
✓ Classification Verification	• Number of multi-use accounts verified / total number of multi-use accounts	• 100 percent
✓ Illegal Connections	• Billable use / Production	• 75 to 80 percent
✓ Arrears	• Revenue collected / Revenue billed	• 90 to 95 percent
	• Total arrears / Quarterly billable revenue	• Less than one quarters billable revenue
Revenue Control	• Actual revenue surplus / Budgeted revenue surplus	• 100 percent
	• Actual revenue surplus retained by Utility	• 100 percent
Customer Education	• Number of domestic accounts notified / Total number of domestic accounts	• 25 percent per year in an on-going program
	• Number of school children educated / Number of school children targeted for education	• 100 percent
Setting User Charges	• Collected revenue / Actual expenses	• At least 100 percent

Recommendations Action Plan
• Develop and implement comprehensive action plans for performance improvement programs.
• Develop and adopt performance indicators for each performance improvement program.

## Private Sector Participation

The Government of Egypt is gradually moving towards a market-orientated economy. With the current advertisement for a Build-Own-Operate-Transfer (BOOT) project for the *East of Cairo Area and North-West Suez Gulf Area Water Supply Project*, it appears the Government is ready to expand private sector participation (PSP) into the water utilities.

The objective of the private sector participation review is to determine the feasibility of contracting all or a portion of the O&M functions of the Canal Cities utilities to the private sector as concessions.

### Applicability of PSP

Private sector participation is already taking place in the Canal Cities' utilities. Operation of the wastewater treatment plants is contracted to SCA and carried out by Timsah, a private company. However, that contract was negotiated at the start-up of the facilities and has been partially funded by USAID. Issues and constraints facing private sector involvement with existing utilities differ from those facing a new facility. The following critical issues must be dealt with:

#### 1. Regulatory Issues

- ✓ Time constraints and the limitations on managerial control have a negative impact on potential investors.
- ✓ Current legislation should be modified to encourage qualified contract operators to pursue private sector opportunities.

#### 2. Employment Issues

- ✓ Private sector companies are able to hire and train qualified personnel locally, as evidenced by the success of the Timsah operation.
- ✓ The ability of a PSP company to provide the same service with personnel from existing utility staff will have to be analyzed on a case by case base.
- ✓ A concessionaire must have the authority to terminate non-performing employees.

#### 3. Financial Issues

- ✓ In general, costs associated with contracting the O&M functions for an existing facility tend to be higher in the short term than continued operation by a government entity
- ✓ In the long term, if the contractor is given appropriate managerial autonomy, savings in labor and operating costs should exceed the cost of return on investment, resulting in an overall reduction of operating costs.
- ✓ The impact of private sector participation on rates and charges depends on how the Government chooses to pass the cost of operations on to the consumer.

## Feasibility of PSP

As evidenced by the SCA/Timsah agreement, it is feasible to involve the private sector in the operations of Canal Cities' utilities. However, the SCA/Timsah agreement was a special case with conditions that do not apply to other utility operations. Attracting qualified investors or contractors to participate in the operation of the Canal Cities' utilities will require modification of existing concession legislation and labor laws, and a willingness to raise tariffs to cover the actual cost of operation.

<b>Recommendations</b>
<b>Private Sector Participation</b>
<ul style="list-style-type: none"> <li>• Lobby national government for changes in concession legislation.</li> </ul>
<ul style="list-style-type: none"> <li>• Lobby decision-makers for tariff adjustments needed to make PSP viable for Canal Cities utilities.</li> </ul>

## Financial Analysis

The long-range goal for the Canal Cities' water and wastewater utilities is to achieve an appropriate degree of autonomy, financial independence, and self-supporting growth to manage and administer their respective systems. The purpose of the Financial Analysis in this Master Plan is to update relevant portions of the 1996 study and to forecast the operational cash flow through 2020.

### Update 1996 Institutional Study

The 1996 Institutional Study reviewed the financial management practices of the SCA and the Governorates. The following table summarizes the utilities' current systems, as they relate to recommendations of the 1996 study, and the changes that will further enhance the financial viability of the utilities.

<b>System</b>	<b>Current Status</b>
Funding of Operation and Maintenance	<ul style="list-style-type: none"> <li>✓ Databases needed to collect and analyze operating costs and revenues have not been maintained due to the lack of a full-time qualified financial staff within each utility.</li> <li>✓ O&amp;M is not fully funded from operating revenues.</li> </ul>
Tariff Structure	<ul style="list-style-type: none"> <li>✓ No action has been taken by decision-makers to implement proposed tariff adjustments.</li> </ul>

Automation of Billing System	<ul style="list-style-type: none"> <li>✓ Present billing system remains basically a manual operation.</li> <li>✓ Utility staff introducing computerization on a limited basis.</li> </ul>
Collection vs. Billing	<ul style="list-style-type: none"> <li>✓ Inability to collect government accounts continues to negatively impact overall collection rates.</li> </ul>
Adequacy of Meters	<ul style="list-style-type: none"> <li>✓ Due to the utility staff's concerted efforts, it is estimated that only about 10% of accounts remain unmetered.</li> </ul>
Adequacy of Computer Hardware and Software	<ul style="list-style-type: none"> <li>✓ End-users are somewhat frustrated with their inability to obtain desired microcomputers and peripherals, supplies, and service.</li> </ul>

### Forecasted Operating Cash Flow

Suez Canal Authority water department personnel provided limited financial information for the institutional and financial aspects of this report. Because the Authority's accounting system does not easily provide detailed financial information about the water and wastewater utilities by community, the information was general in nature and combined data for all three communities. Historical analysis and projected cash flow per community and utility are not available. Based on the limited data provided by SCA the following financial observations and general recommendations can be made for the water and wastewater utilities.

<b>Recommendations Financial Analysis</b>
<ul style="list-style-type: none"> <li>• Procure computerized customer information and billing system.</li> </ul>
<ul style="list-style-type: none"> <li>• Implement performance improvement program for arrears collection, and implement associated organizational and procedural changes.</li> </ul>
<ul style="list-style-type: none"> <li>• Obtain current data and update or create financial models for utilities in each community to allow tracking and budgeting of costs.</li> </ul>
<ul style="list-style-type: none"> <li>• Make appropriate adjustments to water tariffs based on current and complete financial data.</li> </ul>

End of Executive Summary Section

## 1.0 Introduction

Institutional strengthening is a dynamic process driven by the changing service objectives of the Canal Cities' water and wastewater utilities. As new challenges arise, the organization of a utility and the methods of performance improvement must change accordingly. However, to successfully manage change, the Canal Cities utilities must take the following actions:

- Identify programs for improvement.
- Establish a methodology for implementing change with operational performance targets and an action plan for achieving benchmarks.
- Reorganize their institutional structure to support needed changes.

A financial system capable of providing the resources needed to implement changes is critical to institutional change. The institutional and financial review presented in this Master Plan identifies and recommends changes that will strengthen the institutional aspects of the utilities.

The water and wastewater utilities of Suez, Ismailia, and Port Said are separate entities. The water utilities are under the control of the Suez Canal Authority (SCA). The wastewater utilities report to the Governor of their respective areas. Recommendations from a USAID-funded institutional project completed in 1996 by Metcalf & Eddy (M&E) addressed management, financial, organizational, and public relations issues for the water and wastewater utilities. In general, the organizational and management recommendations focused on macro level issues. For example, the recommendations to improve the autonomy and financial condition of the water and wastewater utilities included combining each governorate's utilities under one entity. As of January 1999, draft documents addressing the national policy on water and wastewater utilities suggest that the Government of Egypt would be agreeable to combining the water and wastewater utilities for new cities; however, existing utilities would retain their independence. Recent high level discussions indicate that combining the Canal Cities' existing water and wastewater utilities under control of a central agency is still being considered; however, considering the uncertainty associated with policy changes on a national level, this report's recommendations address only structural and managerial changes within the utilities. These changes can be implemented by current management in the near future and are independent of significant changes in national policy.

Recommendations from the 1996 report by Metcalf & Eddy addressing financial, operational, and public relations focused on activities at the staff level and included modifications to day-to-day operating procedures. In addition, a tariff model was presented to staff for tracking costs and calculating cost-based tariffs. Utility staffs are using some of the M&E institutional recommendations in their daily operations; however, the appropriate management structures to support and encourage the continuation and further use of recommended procedures are lacking. In addition to identifying programs that will improve the financial condition of the utilities, the M&E report also recommends

a system for developing performance improvement programs and an organizational structure that would support the implementation of such programs.

End of Chapter: Introduction

## 2.0 Performance Improvement Programs

Performance improvement programs can range from simple to-do lists developed by managers for staff to comprehensive multi-tasking programs developed by consultants for implementation by utility personnel. However, to achieve sustainable results, a performance improvement program should be developed by utility staff under the guidance of an external consultant. Because of time constraints, it was decided that the potential programs and a corresponding action plan would be developed under the existing scope of work. **Comprehensive programs, which would include the following, should be developed under separate work plans in cooperation with the appropriate utility organizations.**

- Identifying current industry standards and their characteristics for performance.
- Identifying ultimate targets for the utility to achieve and setting benchmarks for achieving the targeted improvements.
- Defining the structure, staff, and systems needed to meet targets and benchmarks.
- Identifying the resources needed for improvements.
- Developing action plans with monthly, quarterly, and annual deliverables.
- Developing performance monitoring plans to track achievement of benchmarks and implementation of action plans.

The objective of the following performance improvement programs is to facilitate autonomy and financial independence of the water and wastewater utilities. Increasing a utility's autonomy and improving its financial condition require changes in policies and procedures associated with revenue generation and collection, budgeting, expenditures, and personnel matters.

### 2.1 Revenue Collections

Revenue billing and the corresponding collections are the responsibility of the SCA and the respective utility. Increasing revenue collections is a function of increasing the billed revenue from current users and improving the corresponding collection. Therefore improvements in revenue collections are directly related to the elements that make up a bill; i.e., legally connected account, use, customer classification, and application of the tariff. Performance improvement programs, which address these elements and can directly impact the revenue collection, include the following:

- Billable Use - confirming proper use is being billed.
- Water Connection Audit - confirming that all legal connections are included in billing data base.
- Classification Verification – confirming that customers are properly classified.
- Illegal Connections - identifying and processing illegally connected users.
- Arrears – dealing with customers whose accounts are in arrears or in default.

Improvements in the water utility's collection of revenue will directly impact the wastewater revenues, as wastewater is a surcharge to billable water charges.

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### **2.1.1 Billable Water Use**

Confirming that all billable water use is being charged for can increase billable revenue and the corresponding collections. Comparing the estimated billable use (from production) with actual billable use (from financial records) will provide guidelines for the level of effort to be applied in confirming that all potentially billable use is being charged for. Industry standards for utilities in developing economies assume that 75 to 80 percent of the water produced should be billable.

Although technical staff indicates that less than 10 percent of accounts are unmetered, the above-defined analysis indicates that more than 35 percent of water is not billed. Therefore, the utility should investigate its metering practices. Specific actions for improvement could include meter replacement or calibration programs, and automatic and more frequent meter reading procedures.

Estimated billable use, that is not being metered or otherwise billed for should be classified as unaccounted-for-water. Leak detection tests in the three study areas indicated that the amount of water being lost to leaks is minimal. This finding suggests that there are significant numbers of illegal connections, improperly maintained or broken meters, or underestimated non-metered accounts. Accounts that have a high probability of being underestimated include public irrigation connections and SCA housing developments. An audit of estimated non-metered accounts has the potential to increase the total billable use.

### **2.1.2 Connections Audit**

Consumers who have contracted for a connection should be promptly entered into the billing database. As soon as the consumer is included in the billing database, the water can be billed for, and the revenue can be collected. This procedure is currently performed manually by the SCA financial department at the central offices in Ismailia. Because new connections require action by both technical and financial personnel, completion of the financial transactions at the utility level, rather than at the SCA level, would enhance the utility's ability to quickly and accurately enter new users in the billing database. This decentralization should be supported by automation of billing and collection activities.

Until billing and collection are automated, utility personnel can manually audit new subscriptions and billing records to confirm that all new users are entered into the system.

### **2.1.3 Classification Verification**

Accounts or connections that serve an entire building are difficult to classify because of the varied occupancy of many buildings. This is particularly true in business districts where the lower floors of buildings are often occupied by commercial enterprises and the upper floors by residential housing. The problem also exists in areas of changeover from exclusively residential to multi-use occupancy. In many cases, the initial occupants of such buildings were residential; therefore, the account for the entire building is classified as residential. As commercial establishments begin to use the connection, changes in the

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customer classification may not be reflected in the billing data. This can negatively impact revenues, as most commercial tariffs are significantly higher than residential tariffs.

Actions for improvement include a verification of the customer classification in the billing database. This task could be assigned to meter readers who visit the meter locations on a regular basis and are in the best position to observe any changes in occupancy. An alternative would be to provide a separate meter to each customer, as is done by the electric utility.

#### **2.1.4 Illegal Connections**

Every utility faces the problem of illegal connections. In many cases, the illegal connection is made by a low income customer who is unable to finance the connection or, in the case of unplanned or haphazard areas, cannot provide the documentation needed to complete a contract for services. Taking these constraints into consideration, the utility can still actively pursue illegal connections. Illegal connections may also include connections made before a meter was installed, new connections in developed areas made without the knowledge of the water utility, or extension of local mains to serve new buildings.

Specific actions for improvement include site investigations. Utility crews and meter readers should be trained to look for new or unusual connections that may be illegal.

#### **2.1.5 Arrears**

Under current operating procedures for collection of arrears, a customer has to be a full year in arrears before his service can be shut off. The resulting large bills are often difficult for customers to pay. In addition, utility management does not currently receive information on the status of the accounts. Proactive collection procedures and informing managers about receivables would encourage a more business-like approach to collection of arrears and could significantly improve overall cash flow. Automation of billing and collection procedures could also improve the efficiency of arrears collections. The existing bill format provides limited information on consumption and charges. It does not include arrears. A new billing format which includes a more detailed statement, including arrears and a payment plan would be beneficial.

In the event that a customer is unable to pay its water bill, strict enforcement of a disconnect policy faces constraints similar to those on illegal connections. Many low-income customers are unable to pay their water bills. In addition, many government entities are unable to pay their water bills due to inadequate budgeting. Strict enforcement of the disconnect policy will not solve these customers' problems. The underlying problem of inadequate utility budgeting for government accounts and lack of payment programs for low-income customers must be addressed before resorting to disconnection of water service.

Specific actions for improved collection of government arrears should focus on assisting utilities in obtaining proper allocation for utility costs in their Ministry of Finance approved budget.

## **2.2 Revenue Control**

Improvements in revenue control can be approached from both the macro and micro levels. On the macro level, a utility should maintain control over its revenue in relationship to external factors such as SCA for the water utilities and the Governorates and SCA for the wastewater utilities. On the micro level, the billing and collection functions of a utility should be provided with means to accurately read meters, calculate bills, and track collections. Changes at both levels will provide the utility with greater autonomy and enable it to improve its financial condition.

### **2.2.1 Macro Level**

Revenues generated and collected by the water utility are recorded as line items in the SCA chart of accounts. Revenues associated with stamps, taxes, and associated government charges are forwarded to the appropriate agency. Water revenues for billable uses are used to offset the water utility's operating expenditures. Expenditures are based on an authorized budget and, for water utility management, are not directly dependent upon revenues. Financial comparisons between water revenues and expenditures are made by the SCA Financial Department, beyond the immediate sphere of the water utility management. Because the financial comparisons are made at a higher level, the water utility management is not directly involved or accountable for the results of these comparisons and there is little incentive or encouragement for utility managers to practice revenue control.

In order to improve revenue control, the utility must become actively involved in cash flow analysis and balancing its budget. This level of involvement necessitates the development of a financial department at the utility level as identified in the Organization Structure section and recommended in the Revenue Collections section of the Performance Improvement Programs. A performance improvement program supporting the development of a financial department will be the first step towards increasing the water utility's control over its revenues.

Control of wastewater revenues is dependent on consistent and timely transfer of funds from SCA to the utilities within each Governorate. This transfer of funds must be supported by development of a financial department within each wastewater utility which should be responsible for performing cash flow analyses and balancing budgets. Without a financial department, the control of revenues would transfer from SCA to the Governorate, resulting in minimal impact on the wastewater utility's ability to control its finances. A performance improvement program that first develops the financial department within the wastewater utility and then facilitates the timely transfer of funds from SCA to the utilities will move the wastewater utility towards financial control.

### **2.2.2 Micro Level**

Staffing the financial departments with qualified personnel and equipping them with the appropriate tools is critical to the successful implementation of performance improvement programs. The creation of the financial department requires the development of standard operating procedures pertaining to the billing and general financial administration. Current technology in the utility industry, such as computerized customer information, billing, and accounting systems and electronic meter reading devices are needed to support the proposed staff and systems. A detailed explanation of the impact of computerization is included in the Financial Analysis section, under Automation of Billing System.

## **2.3 Customer Education**

Detailed community education programs dealing with water conservation, wastewater control, public health and water-borne diseases, and disposal of hazardous wastes were developed and implemented under the Canal Cities Phase II Technical Assistance Project. The programs targeted both adults and school children. The adult program consisted of distribution of printed material. The school program not only provided printed material, but also encouraged the curriculum for grade school children to include utility related subjects.

Performance improvement programs for education of the customer on the need to pay for water and wastewater service and to make utilities self-sustaining are highly recommended and should build on the successes of the Canal Cities Phase II Technical Assistance Project education program. New printed material discussing the costs associated with building and operating utilities could be distributed to the public to help them understand the value of the utility services. Likewise, the curriculum for grade school children could be expanded to include basic financial matters.

The approach to financial topics to be addressed in the educational material should focus on the benefits consumers are receiving from the utilities for a relatively small portion of their overall living expenses. Actual financial data about the utility would strengthen the presentation of the benefits the utility is providing by showing costs associated with their services. The proposed restructured financial group would have the capabilities to provide current financial data to incorporate into the presentation.

## **2.4 Setting User Charges**

Under the current system, the water utilities are not encouraged to independently request or suggest needed increases in user charges. Expenditures are approved based on operational needs and are independent of the revenue billed or collected. The water utilities are not responsible for balancing their budgets. When necessary, SCA makes up shortfalls of revenue. However, lack of actual cost information should not prevent the water utility management from determining the adequacy of existing charges. Good

financial management is key to an efficiently run utility. If a water utility desires to move towards autonomy in setting user charges, it must be able to justify the proposed rate increases with accurate and timely data on its revenue and expenditures.

The determination of justifiable and adequate tariffs or user charges requires appropriate documentation. Information collected by the proposed financial department identified in the Organizational Section of this report could provide the basis for calculating user charges. A detailed utility cost of service and tariff design model was developed for the Suez water utility under the Canal Cities Phase II Technical Assistance Project. To be effective, this model must be fully implemented and updated annually. Use of this model by the financial department would provide the documentation and justification needed for changes in user charges.

End of Chapter 2: Performance Improvement Programs

### **3.0 Organizational Structure**

The purpose of reviewing the present organizational structure of the water and wastewater utilities for the Canal Cities is to identify and develop improvement programs or restructuring of existing systems which will facilitate autonomy and financial independence of the utilities. Increased autonomy and improved financial conditions are directly related to a utility's ability to independently control revenues, expenditures, and personnel matters.

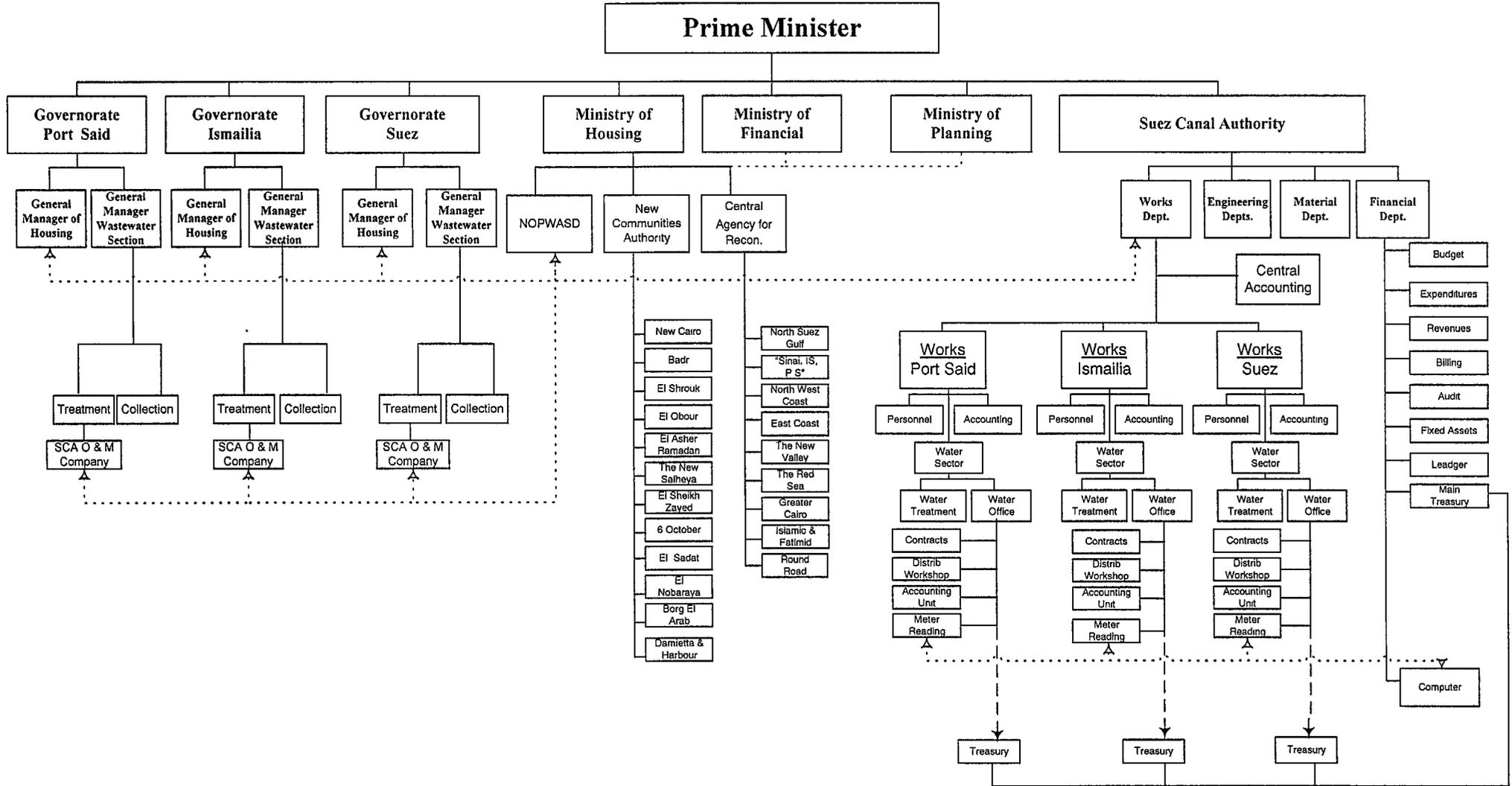
#### **3.1 Existing Systems**

The water and wastewater utilities of Suez, Ismailia, and Port Said are separate entities. The water utilities are under the control of the SCA. The wastewater utilities report to the Governor of the respective area. NOPWASD provides planning and technical guidance for the wastewater utilities. The relationship between the utilities, the governorates, and the SCA is illustrated in Figure V7-3.1.

**Figure V7-3.1 Organizational Structure**

(next page)

# Organizational Structure Canal Cities Water and Wastewater Utilities



ARAB REPUBLIC OF  
EGYPT  
SUEZ CANAL AUTHORITY  
NATIONAL ORGANIZATION FOR  
POTABLE WATER AND SANITARY DRAINAGE

USAID  
CANAL CITIES  
WATER AND WASTEWATER  
MASTER PLAN

**ORGANIZATIONAL STRUCTURE**  
Canal Cities Water and Wastewater Utilities

BLACK & VEATCH INTERNATIONAL  
in association with  
MONTGOMERY WATSON SABBOUR ASSOCIATES

Date: September 1999

Figure. V7-3.1

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### **3.1.1 Water Utilities**

The Suez Canal Authority directs the financial and administrative activities of the water utilities. Water utility budgets are based on past expenditures and anticipated new costs and are prepared at the utility level and submitted for approval to the SCA Board of Directors. The utilities are not required to submit a cash flow analysis that balances revenues and expenditures. Because the water budget for the three utilities is such a small portion, less than 3 percent, of the total SCA budget, there is minimal focus on balancing the budget at the sector level.

Expenditure budgets are technically oriented and are subdivided into three categories: Salaries, Equipment, and Maintenance.

Revenues are generated from the sale of water and other services. The amount of water sold is based on quarterly meter readings by the Meter Reading Groups. The billing information is electronically forwarded to the financial departments of the SCA for preparation of the water bills, which are returned to the respective water utility for distribution and collection. Records of collections and arrears are manually generated and forwarded to the SCA financial department.

Revenue generated from other services, such as inspection and installation fees, is the responsibility of each water utility's Accounting Unit. Information pertaining to this revenue is manually recorded, summarized on computer spreadsheets, and forwarded to the SCA financial department.

Expenditures are tracked at individual treatment sites and for the three distribution systems. The Accounting Unit authorizes budgeted expenditures and summarizes expenditure information for each community. Expenditure data is forwarded to the SCA financial department.

Personnel is responsible for issues related to the staff of the Works Section. CAO (Central Accounting and Organizational Authority) provides the guidelines for staffing numbers and level and MOF (Ministry of Finance) provides funding for CAO-approved positions. In general, the water utilities at SCA are comfortable with their staffing levels.

### **3.1.2 Wastewater Utilities**

Wastewater service is provided by the respective governorate of each of the Canal Cities. Each governorate has a General Manager for Wastewater Services who is responsible for the administrative and financial activities associated with the wastewater systems. The operations of the wastewater systems are separated into treatment and collection.

Newly constructed wastewater treatment plants, financed by USAID, are operated by Timsah Company, a subsidiary of SCA, under a management contract between SCA and NOPWASD. NOPWASD administers the contract for the Governorates and is

responsible for regular payments to SCA. Under the management contract, SCA prepares an annual operating budget for submission to NOPWASD.

The wastewater collection system (pipelines and pumping stations) is the direct responsibility of the General Manager for Wastewater Services within the Governorate. Budgets are developed in conjunction with the Budget Section at the Housing and Utilities Directorate and submitted along with the total Governorate's budget to the Ministry of Finance for approval. A portion of the fixed budget amount authorized by the Ministry of Finance for the Utilities and Housing Directorate is allocated to the wastewater utility. Expenditures are authorized in accordance with this allocation.

Revenues for the wastewater system are directly linked to the water bill. A surcharge of 35 percent for domestic and 50 percent for non-domestic customers is applied to each water bill for wastewater service. Each quarter, revenues for wastewater service are recognized on the SCA financial records. Based on interviews with water and wastewater utility staff, it appears that the revenues for wastewater are transferred to the Governorates to cover the costs of wastewater collection or are applied against the costs associated with water services provided to the Governorates by SCA.

## **3.2 Proposed Changes**

Current national policies suggest a movement towards combining a community's existing water and wastewater utilities into a single entity. However, discussions with SCA indicate there is little interest in taking responsibility for the existing Canal Cities' wastewater collection systems and express concern over giving up control of water services. Given these conditions, improvements to the water and wastewater utilities that can be implemented in the short term should focus on changes within the existing utility organizations and the Governorates.

Increasing a utility's autonomy and improving its financial condition requires changes in policies and procedures associated with revenue generation and collection, budgeting, expenditures, and personnel. Keys to effective control of these elements are empowerment of decentralized managers and good communication between technical, financial, and administrative personnel. The following proposed organizational changes would decentralize the financial activities of the utilities, empower managers at cost center level, and enhance the communication network within the utility. These changes support the successful implementation of proposed performance improvement programs.

### **3.2.1 Water Utilities**

Under the existing organizational structure, utility personnel forward revenue and expenditure data to the appropriate SCA financial department without performing cash flow or income statement analyses. This practice does not encourage balancing of budgets at the Sector level. In addition, because the financial analysis is done by SCA, utility personnel do not have a complete understanding of the true costs of operating the water utility, as they are not informed of many non-technical costs.

Decentralized financial and administrative departments are recommended for each water utility. These departments would be responsible for revenues and expenditures. By combining revenue and expenditure functions in one department, cash flow analysis can be performed on a regular basis, providing senior management with needed financial information to make decisions about tariff adjustments, expenditure requests, and capital needs.

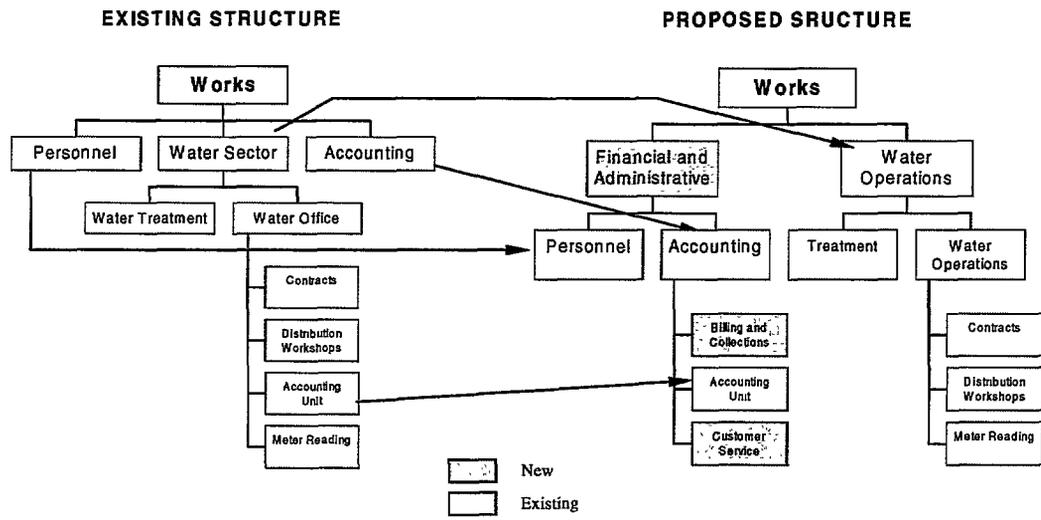
Expenditure-related activities would include preparation of budgets, approval of expenditures, tracking actual costs, and reporting to the SCA financial departments. Revenue-related activities would include preparation of budgets, billing and collection, and reporting to the SCA financial departments.

A comparison of the existing and proposed organizational structure for a Canal Cities' Water Utility is shown in Figure V7-3.2. Personnel, Accounting, and the Accounting Unit could be combined into a Financial and Administrative Department. This department, working with the Water Sector, could provide timely information to the Waterworks Manager.

### **3.2.2 Wastewater Utilities**

Under the existing structure, the wastewater utility has limited autonomy concerning its revenues and expenditures. As a result, senior management does not have ready access to information needed to perform cash flow analyses. Without this information, managers are unaware of the actual cost of operations or the need to control costs. Reorganizing the utility operations to include a financial department directly reporting to the General Manager for Wastewater Services would provide the conduit for funneling needed financial information to senior managers. Information concerning the revenue billed, in addition to copies of authorized expenditures, would be routed through this department. Financial personnel could analyze and summarize the information into useful reports for senior managers. A representative of the wastewater utility should be included in the water utility's billing organization in order to obtain timely revenue data. In the event that the wastewater utility is unable to position an employee at the water utility, standard operating procedures and policies should be agreed upon between the water and wastewater utilities for exchange of necessary information.

**Figure V7-3.2 Alternative Organizational Structure for Canal Cities Water Utility**



End of Chapter 3: Organizational Structure

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## 4.0 Action Plan

The purpose of an action plan is to organize the steps needed to logically implement changes, to quantify time requirements for implementing the changes, and to identify the parties responsible for managing the change.

### 4.1 Implementation of Changes

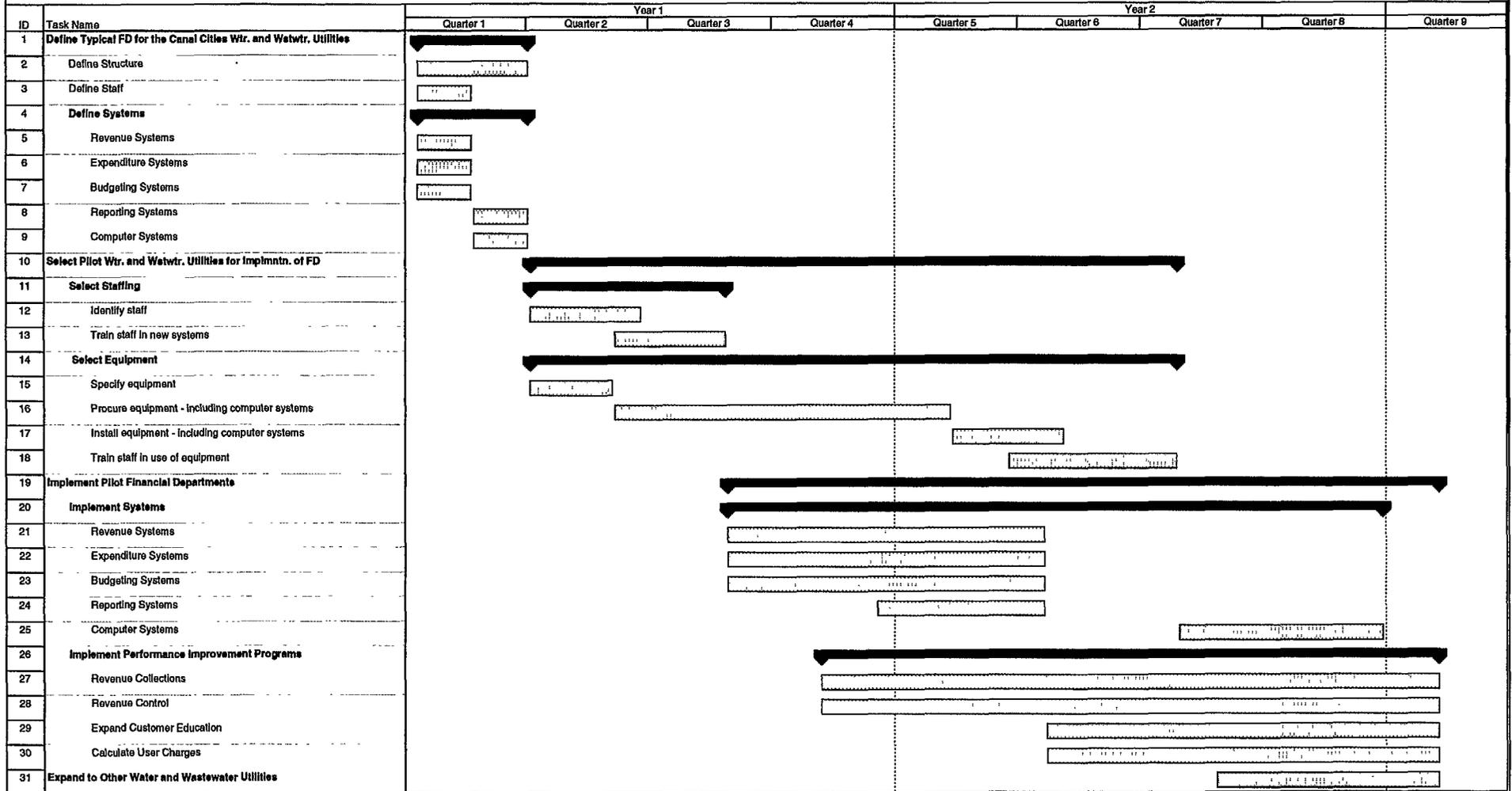
Implementation of an internally developed, comprehensive performance improvement program, as defined in the introduction to the Performance Improvement Programs section, would develop a detailed action plan including the assignment of responsibility for development of individual systems by specific parties. In addition, distinct time frames would be identified for completion of such assignments. Internal development of such an action plan improves sustainability by providing decision-makers with adequate information and obtaining buy-in from its developers. The following action plan outline provides the **framework** for an internally developed comprehensive action plan.

**Table V7-4.1 Action Plan Framework for Implementation of Performance Improvement Programs**

Action	Work Effort	Party Responsible for Implementation
<b>Define Typical Financial Department for the Canal Cities Water and Wastewater Utilities</b>		
Define Structure	2 months	Senior Management, Financial Management, U.S. Consultant
Who Is Responsible For What		
Who Reports To Whom		
Define Staff	1 month	Senior Management, Financial Management, U.S. Consultant
Number Of Staff Required		
Qualifications Of Staff		
Define Systems	2 months	Senior Management, Financial Management, Financial Specialist, U.S. Consultant
Revenue Systems		
Expenditure Systems		
Budgeting Systems		
Reporting Systems		
Computer Systems		
<b>Select Pilot Water and Wastewater Utilities for Implementation of Financial Department</b>		
Select Staffing		
Identify Staff	2 months	Senior Management, Financial Management
Train Staff In New Systems	2 months	Financial Management, U.S. Consultant
Select Equipment		
Specify Equipment	2 months	Consultant
Procure Equipment – Including Computer Systems	6 months	Financial Management, U.S. Consultant
Install Equipment - Including Computer Systems	9 months	Computer Vendor
Train Staff In Use Of Equipment	3 months	Financial Management, U.S. Consultant, Computer Vendor
<b>Implement Pilot Financial Departments</b>		
Implement Systems		
Revenue Systems	6 months	Financial Management, Financial Staff, U.S. Consultant
Expenditure Systems	6 months	
Budgeting Systems	6 months	
Reporting Systems	3 months	
Computer Systems	4 months	
Implement Performance Improvement Programs		
Revenue Collections	11 months	Financial Management,
Revenue Control	11 months	Financial Staff, U.S.
Expand Customer Education	7 months	Consultant
Calculate User Charges	7 months	

A schedule for implementing the action plan is shown in Figure V7-4.1. Institutional change is a long-term commitment. In order to achieve sustainable change, the foundation for such change must be in place and supported by senior management and staff. As indicated in the schedule, the first nine to twelve months focus on organizational changes and defining and adopting new systems. Only after the systems have been approved can they be implemented.

## Schedule for Implementation of Action Plan



Task [Bar] Summary [Bar]

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Implementation of the systems and the corresponding performance improvement programs are scheduled for the second half of the plan.

## 4.2 Performance Measures

Changes proposed in any performance improvement program are theoretical until they are implemented. Once implementation begins, performance indicators can be used to monitor the effectiveness of the changes. Improvement in performance indicators reinforces the performance improvement programs. No change or negative changes in a performance indicator signals the need for modification of the improvement program.

The first step in developing performance measures is careful evaluation of existing conditions and current performance. Then, the desired criteria or performance levels are identified. Based on the difference between the long-range target and the baseline condition, intermediate benchmarks that provide a time frame and schedule for meeting the desired targets can be determined. Finally, action plans identify the steps needed to improve performance and to meet the scheduled targets. This process, which corresponds with the development of comprehensive improvement programs recommended in the Performance Improvement Programs section, provides needed information to set final priorities for the institutional strengthening programs.

Samples of potential performance indicators for the programs identified in the Performance Improvement Programs section are summarized in the following table.

**Table V7-4.2 Potential Performance Measurements for Proposed Performance Improvement Programs**

Performance Program	Performance Indicator	Target or Benchmark
Revenue Collections		
✓ Billable Use	• Number of bills with estimated use / Number of bills	• Less than 10 percent
	• Billable use / Production	• 75 to 80 percent
	• Use based on meter reads / Total use billed	• Greater than 90 percent
	• Number of working meters / Total number of meters installed	• 100 percent
	• Meters calibrated / Total number of meters	• 100 percent
✓ Connections Audit	• Number of customer contracts / Number of billable accounts	• 100 percent
	• Number of new accounts included in billing system in less than 2 months / Total number of new accounts	• 100 percent
✓ Classification Verification	• Number of multi-use accounts verified / total number of multi-use accounts	• 100 percent
✓ Illegal Connections	• Billable use / Production	• 75 to 80 percent
✓ Arrears	• Revenue collected / Revenue billed	• 90 to 95 percent
	• Total arrears / Quarterly billable revenue	• Less than one quarter's billable revenue
✓ Revenue Control	• Actual revenue surplus / Budgeted revenue surplus	• 100 percent
	• Actual revenue surplus retained by Utility	• 100 percent

<b>Performance Program</b>	<b>Performance Indicator</b>	<b>Target or Benchmark</b>
✓ Customer Education	• Number of domestic accounts notified / Total number of domestic accounts	• 25 percent per year in an on-going program
	• Number of school children educated / Number of school children targeted for education	• 100 percent
✓ Setting User Charges	• Collected revenue / Actual expenses	• At least 100 percent

End of Chapter 4: Action Plan

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## 5.0 Private Sector Participation

Egypt is gradually moving towards a market-orientated economy. Over the past five years, the private sector has been investing in industry, agriculture, tourism, electric power, and telecommunications. With the current advertisement for a Build-Own-Operate-Transfer (BOOT) project for the *East of Cairo Area and North-West Suez Gulf Area Water Supply Project*, it appears the Government is ready to expand private sector participation (PSP) into the water utility.

The objective of the private sector participation review is to determine the feasibility of contracting all or a portion of the O&M functions of the Canal Cities utilities to the private sector as concessions.

### 5.1 Applicability of PSP

The private sector does participate in the operation of the Canal Cities' utilities. Operation of the wastewater treatment plants is contracted to SCA, which has subcontracted Timsah, a private sector subsidiary of SCA. However, that contract was negotiated at the startup of the facilities. Issues and constraints facing private sector involvement with existing utilities differ from those facing involvement with a new facility.

#### 5.1.1 Regulatory Issues

The Government of Egypt legislation permits concessions in the water utility. However, such concessions are limited to five-year terms, and the concession grantor has powers of interventionist that can limit the degree of financial and management control by potential contractors. Both the time constraints and the limitations on managerial control detract from the attractiveness of the concession to potential investors. **Current legislation should be modified to encourage qualified contract operators to pursue private sector opportunities.**

#### 5.1.2 Employment Issues

A concession would require the contractor to establish a business presence in Egypt, and to comply with the Egyptian labor laws. The Egyptian Government has repeatedly guaranteed that privatization programs will not harm public sector employees. Restructuring or downsizing, which the concessionaire may desire to make a project financially feasible, may not be possible under existing political and legal constraints. To address these problems, the Government and the concessionaire must investigate secondment or new employee contracts. If a reduction in the work force is considered necessary or desirable, the Government may negotiate early retirement programs for some employees.

Private sector companies are able to hire and train qualified personnel locally, as evidenced by the success of the SCA operation of the new wastewater treatment plants.

However, the ability of a contractor to find equally qualified personnel from existing utility staff will have to be determined on a case-by-case base. **A concessionaire must have the authority to terminate non-performing employees.**

### 5.1.3 Financial Issues

Many uninformed public employees view private sector participation as a way to allocate responsibilities while maintaining financial and managerial control for a facility. In reality, in order to attract qualified contractors, a concession must allocate risk to the appropriate participant and provide a marketable return on investment.

A concession or management contract contains a number of types of inherent risk. Table V7-5.1 identifies the types of risk and the appropriate responsible parties.

**Table V7-5.1 Risk Allocation**

<b>Risk</b>	<b>Party Responsible for Assuming Risk</b>
Country / Political	Government
Inflation / Growth Rate	Government
Interest Rate	Concessionaire
Exchange Rate	Varies. The higher the risk, the more likely the Government will have to bear the risk.
Force Majeure	Government
Technical Performance	Concessionaire
Operations	Concessionaire

In general, the costs of contracting the O&M function for an existing facility tend to be higher in the short term than continued operation by a government entity. This is due to labor costs and providing the contractor with an adequate return on investment. In the long term, if the contractor is given appropriate managerial autonomy, savings in labor and operating costs should exceed the cost of the return on investment, resulting in an overall lower cost. The impact on rates and charges is dependent on how the Government chooses to pass the operating costs on to the consumer.

## 5.2 Feasibility of PSP

As evidenced by the SCA/Timsah agreement, it is feasible to involve the private sector in the operation of Canal Cities' utilities. However, the SCA/Timsah agreement was a special case, with conditions that do not apply to other utility operations. **Attracting qualified investors or contractors to participate in the operation of the Canal Cities' utilities will require modification of existing concession legislation and labor laws and a willingness to raise tariffs to cover the actual cost of operation.**

End of Chapter 5: Private Sector Participation

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## **6.0 Financial Analysis**

The long-range goal for the Canal Cities' water and wastewater utilities is to achieve an appropriate degree of autonomy, financial independence, and self-supporting growth. Moving the utilities towards financial viability is critical to the achievement of this goal. USAID supported the goals of the utilities by funding an institutional study that was completed in 1996. The purpose of the Financial Analysis in this Master Plan is to update relevant portions of the 1996 Study and to forecast operational cash flow through 2020.

### **6.1 Update 1996 Institutional Study**

The 1996 Institutional Study reviewed the financial management practices of the SCA and the Governorates. Based on the review, recommendations were made for changes in metering, billing, and collection procedures to enhance the financial viability of the utilities. The study included a review of the tariffs and a model for tariff design. The following are comments on the utilities' current systems, as they relate to recommendations of the 1996 study, and changes that will further enhance the financial viability of the utilities.

#### **6.1.1 Funding of the O&M**

Revenues from current tariffs are not adequate to cover the operating costs of either the water or the wastewater utility. Recommendations made in 1996 included developing the databases needed to collect and analyze operating costs and revenues. The financial planning and tariff design model used information from the database to identify needed adjustments in the tariff to move the utilities toward covering the operating costs. The model was developed and introduced at the Suez Water Utility. The intention was for the trained personnel at Suez to assist in the distribution and use of the model in the other communities.

Lack of a qualified full-time financial staff within each utility has limited the effectiveness of the recommendations. Appropriate personnel are not available within the utility to maintain the databases, analyze the data, and interpret the financial implications of recommended changes.

Recommendations concerning the organizational structure discussed in the Organizational Structure section of this report would support the implementation and use of suggestions of the 1996 Study.

The adequacy of the existing tariffs to cover operating costs through fiscal year 2020 is reviewed in Section 6.2 Forecasted Operating Cash Flow.

#### **6.1.2 Tariff Structure**

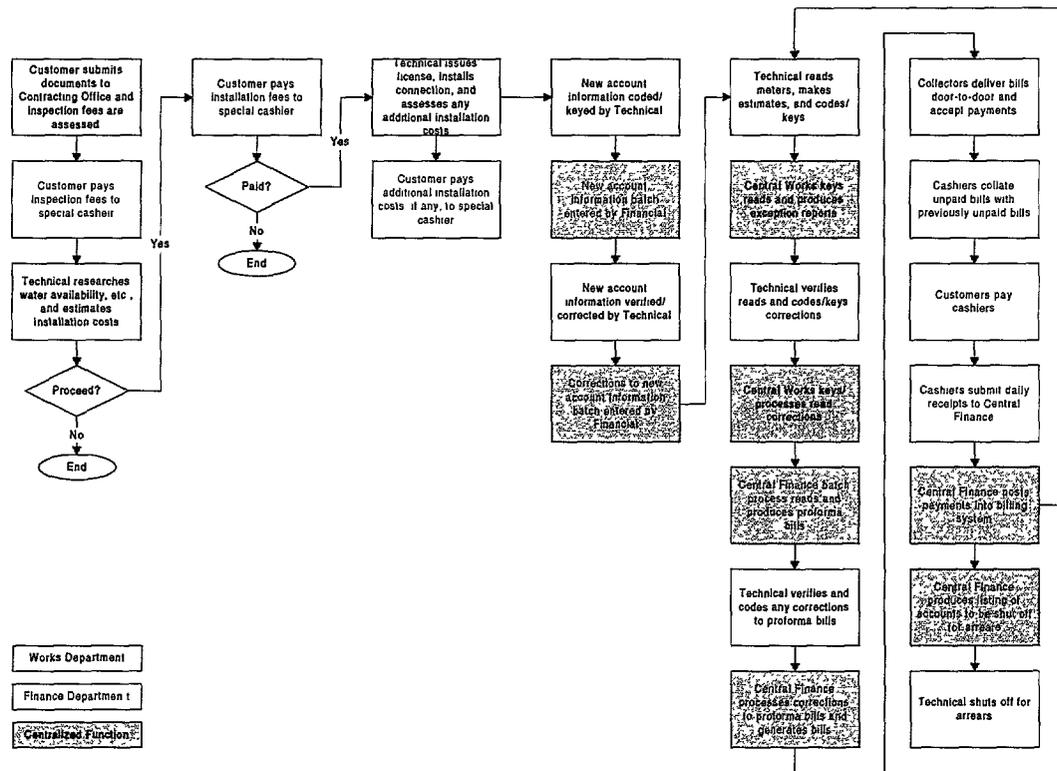
Based on modeling results, the 1996 study calculated tariff adjustments for each of the Canal Cities' communities. Proposed alternative tariff structures introduced to utility staff

retained the existing rate structure and modified the value of each tariff. No action was taken by decision-makers to implement the tariff adjustments.

### 6.1.3 Automation of Billing System

The present billing system is largely manual, with tasks divided between Works and Finance. Works takes full responsibility for establishing customer accounts, providing most customer services, and meter reading. Finance accepts the meter reading results from Works, prints the bills, and manages revenue collections. Separate Works Department sections handle new subscriptions, deposits and meter insurance, and meter reading. A major responsibility for account accuracy rests upon meter readers who note changes in the use of premises or structures, which may result in a rate change. Meter reading staff also provide limited customer service by answering reading (and thereby billing) questions. Figure V7-6.1 illustrates the typical flow of data from account opening through billing.

**Figure V7-6.1 Typical Flow Chart for Opening Customer Account, Billing and Collection**



The basic billing process can be divided into three major categories: account maintenance, routine billing, and miscellaneous charges:

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### **6.1.3.1 Account Maintenance**

Account maintenance includes adding new connections, rate code changes, deleting records for removed connections, payment plans, and other data changes. All account maintenance is achieved using coding forms, which are sent to the central office in Ismailia for key entry and batch processing. This processing occurs quarterly. Hard copy reports are printed at the central office (Central) and sent to the respective network centers for verification and, if necessary, correction.

A major challenge is accurate assignment of rate codes for mixed-use accounts (i.e., accounts with both residential and commercial tenants). Current procedures are to change the tariff class if the water use exceeds one cubic meter per day per flat.

### **6.1.3.2 Routine Billing**

The quarterly billing process begins with meter reading staff entering readings into field books, from which they are copied into reading books along with manually calculated amounts of use. At this point, the readers may adjust the use to reflect conditions noted in the field. The reading books are transported to a separate section for data entry, either in each city or at the Central Works Department. Limited exception reporting from the computer system is used to generate requests for re-reading. A computer generated readings list is manually compared to reading book entries (Audit 1). Actual bill printing is automated and occurs six to eight weeks after reading.

A preliminary billing register is generated and checked by Works staff prior to actual bill printing (Audit 2). After printing at Central, the two-part bills are manually separated. Bills are grouped by section and subsorted by account number to facilitate distribution to field collectors. Collectors hand deliver bills to the service address and may make immediate collection. If the bill is not paid upon delivery, the stub is left for the customer and the main portion of the bill is returned to cashiers to await the customer's coming in to the office to pay. All field collections are returned to cashiers at the end of the day. At one time, collections offices were spread throughout the city for the convenience of the customer. The use of branch offices has since been abandoned in Suez. However, it is the customers' responsibility to know where to pay his bill, as payment is accepted only at the assigned office. Upon payment, whether in the field or in a payment office, the customer is given the main portion of the bill as a receipt. A coding form is used to record daily receipts. Forms are sent to Central Finance for data entry.

To track and collect arrears, unpaid bills are manually collated by account number at the assigned cashier's station. In this way, if a customer has arrears, all outstanding bills are filed together and the cashier can request payment in full. A customer may, however, be allowed to pay any single outstanding bill. No partial payments are accepted.

Payments are recorded on coding forms and sent to the Central finance office for data entry and posting against accounts receivable. All processing is handled in a batch entry mode. Periodically, the finance office sends a list of delinquent accounts to the network

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office. This handwritten list includes accounts that have remained unpaid for at least one year. An estimated 150 accounts per month are shut off in Suez, and a similar number in the other cities.

Customers are permitted to arrange payment plans for selected services, such as installation fees and arrears. Arrears payment plans are arranged through the Finance Department. Payment plans for installation fees are for a two-year term and are arranged by the technical staff. Installment payments are entered into the billing system using a recurring charge field, and appear on the bill. Technical staff manually track these payment plans and, at the end of the term, send a coding form changing the recurring charge to zero. Payment plans are not allowed for repairs.

### **6.1.3.3 *Miscellaneous Charges***

Miscellaneous charges include inspection and installation fees; consumption insurance, equal to an estimated three months' consumption charge; and meter deposits and repairs.

The Accounting Section computes and tracks non-consumption related charges. This is a totally manual process. All monies are paid to cashiers. Tracking is done using a Lotus spreadsheet. The spreadsheet is initialized monthly. Additionally, Accounting prepares any required breakouts of a single bill into multiple bills.

Based on current operating procedures, the following areas of exposure could be addressed with an automated billing system.

- Meter books are hand-written, with new books required every three to four years. Each book is divided into sections, with extra pages at the end of each section. New accounts are entered on these blank pages chronologically by section. No attempt is made to sequence the books into geographic routes; i.e., book order never changes. This process is both inefficient and subject to the errors inherent in manual data entry.
- Readings are initially recorded in field books, then copied into permanent books, and finally key entered into the billing system. Conversion to the use of hand-held meter reading devices, now in its pilot stage, will eliminate this cumbersome and error-prone process. Numerous manual checks are used to catch errors.
- Payment plans can be established for certain charges. Agreed-to payments are coded to recur on bills. Tracking is manual and, upon payment in full, the amount of recurring charge is reset to zero. The manual process has the potential for either omitting entry of a recurring charge or continuing a charge beyond its contracted expiration.
- Use of the physical bills to track arrears and payments provides opportunities for abuse and loss of records. Summary information needed for management is not readily available.

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- Customer service is very limited, and those who do answer customer questions have limited knowledge of an account's financial status. Customers are required to contact multiple parties to obtain even simple information regarding their account.
- Arrears collection is not actively pursued. The delay in issuing shut-off orders and the inaccessibility of records may result in a shut off even though the account has been paid.
- Existing mixed-use accounts result in frequent requests for special meter installations. The currently used manual process involves checking for unpaid bills, technical evaluation of the request, a special reading, and prorating any outstanding balance. The process is both labor intensive and subject to errors.
- The existing billing system allows entry of water charges at two separate rates per account. The allocation of actual consumption into rate classes is done manually. If there is only one meter for mixed-use accounts, the higher category rate is used until a second meter is installed. The existing process is subject to error and misuse and does not necessarily result in equitable billing.

**Areas of opportunities for the utilities that can be addressed with automated billing systems include:**

- Use of automated reading devices together with appropriate routing could greatly reduce the effort associated with preparing meter books, improve reading efficiency, and eliminate errors inherent in manually copying the readings from form to form.
- Automatic screening for reading exception, both in the field and upon transfer to the billing system, can include tests for abnormal readings, meter rollover, and missing data.
- Currently, consumption amounts are manually calculated from reading data and, where necessary, estimated. Automation of these functions would eliminate errors and reduce opportunities for misuse.
- A flexible, automated payment plan and tracking procedures would enable the utility to provide better customer service while improving the collection of arrears.
- On-line accounts receivable functions would permit any cashier to accept any payment and would form the foundation for meaningful management reports.
- Using computer-generated reports, agents could actively pursue timely payment of accounts, identify chronically late-paying customers, and improve the revenue stream in general.

**6.1.4 Collection vs. Billing**

Canal Cities' utilities encounter the same obstacles as other utilities in Egypt when they attempt to collect bills. In general, collection rates for private accounts are very high, in some cases approaching 95 percent. This is partially due to the ability to enforce the

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utilities' disconnecting policy. However, the inability of the utility to collect total billed revenue from government accounts significantly reduces the utility's overall collection rate. Inadequate budgeting for utility bills prevents most government customers from paying their full amount. **Lobbying the Ministry of Finance to allocate government accounts adequate budgets for water and wastewater costs is the primary solution to improving collection rates.**

#### **6.1.5 Adequacy of Meters**

The utilities have made a concerted effort in recent years to decrease the number of unmetered accounts. Technical staff have estimated that only about 10 percent of all accounts remain unmetered. All installed meters are numbered.

Key concerns expressed by staff include the need to divide accounts serving multiple customers into separately metered accounts. This would allow for equitable billing and eliminate problems with mixed-use properties; i.e., properties having characteristics that fall in two or more rate classes. A second concern is the growing number of accounts. Staff estimate a rate of growth as much as 1 percent per month, at least partially attributable to the ongoing efforts toward one account per customer, with no unmetered accounts.

The utilities continue to improve metering of water service. Given the current growth patterns and the need to identify mixed-use accounts, more resources are needed for the on-going metering program. **One of the performance improvement programs has identified the need for additional metering related activities such as meter replacement and meter calibration. Implementation of these activities will further strain the current resources.**

#### **6.1.6 Adequacy of Computer Hardware and Software**

Three separate computer systems are employed in the billing process. At Suez and Port Said, readings and preliminary data verification is done using software developed externally about ten years ago. In Ismailia, an internally developed dBASE IV program is used for readings. In all cases, reading files are passed, either via modem or on diskette (Ismailia), to the DEC mainframe in Central Finance for bill production and receivables tracking. The COBOL based billing software used in the mainframe computer was developed by ICL and was migrated to the DEC platform in 1993.

The Works Department recently initiated a pilot program of automated meter reading (AMR). The initial program includes five Radix FLX605 hand-held meter reading computers in Ismailia. The schedule called for all meter reading to be done using AMR by June 1999. Also included in the plan was implementation of radio transmitted readings beginning in December 1998.

Computer hardware is the responsibility of the Navigation Control Department, although repairs to "dumb terminals" are handled through the Central Finance Computer

Department. This arrangement appears to leave the end-users somewhat frustrated because of their inability to obtain microcomputers and peripherals, supplies, and service.

Hardware includes:

**Suez**

- Dumb terminal (readings entry).
- 4800 BAUD General Data Com modems.
- AMT ACCEL 535 dot matrix printer.
- Optiquest 1769DC microcomputer with 549M hard disk (accounting).
- Epson LQ 1170 dot matrix printer (accounting).

**Ismailia**

- Microcomputers, 4 each (readings entry).

**Port Said**

- Dumb terminals.
- 4800 BAUD General Data Com modems.

**Central Works**

**Central Finance**

- DEC 5000, UNIX OS.

**In conjunction with the performance improvement programs, a computer and equipment needs audit should be conducted. Hardware and software required for efficient operation of the financial department should then be budgeted and obtained during the pilot implementation program.**

## **6.2 Forecasted Operating Cash Flow**

Suez Canal Authority water department personnel provided financial information for the institutional and financial aspects of the master plan report. The Authority's accounting system does not easily provide detailed water and wastewater financial information by community. The information that was provided was general in nature and combined data for all three communities. Historical analysis and projected cash flows per community and utility are not available. Based on the limited data provided by SCA, the following financial observations can be made for the water and wastewater utilities.

### **6.2.1 Arrears**

- Arrears (unpaid bills) decreased by 6.7 percent between 1996 and 1997, which was followed by an increase of 15.6 percent between 1997 and 1998.
- Between 1997 and 1998 arrears increased by L.E. 9.3 million, approximately 21.7 percent of the billable water revenues.
- Continuation of the current arrears trends will hinder the utilities' move towards financial viability. **Implementation of recommended performance improvement programs for arrears collection and associated organizational**

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structure changes could move the utilities towards total recovery of daily operating costs without adjusting tariffs.

### 6.2.2 Cash Flow

- Estimated collected revenue (based on billable revenue less increase in arrears) is approximately equal to the SCA defined water operating expenses as illustrated in the following table:

**Table V7-6.1 Comparison of Collected Revenues and Operating Costs for 1997-1998 Fiscal Year**

	L.E.
Billable water and wastewater revenue	42,919,652
Less estimated arrears	(9,307,182)
Estimated collected revenues	33,612,470
Less collected revenues for wastewater	(7,381,737)
Estimated collected revenues for water	26,230,733
SCA defined operating expenses for water	26,234,574

- SCA separates depreciation costs from operating costs, implying that capital related costs are not included in operating costs. **Collection of arrears would provide needed cash to cover a portion of capital related costs, including repair and replacement expenses.**
- Wastewater system cash flow could not be addressed because of unavailability of financial data.

### 6.2.3 Tariff Adjustments

- In order to cover operating costs and capital costs related to depreciation, an increase in tariffs is needed. **Based on financial data provided by SCA, if arrears were significantly reduced, water tariffs would have to be increased by about 13 to 15 percent to cover existing levels of expenditure.**
- If the current trend in arrears continues, water tariffs will need to be increased by at least 50 percent in the future to cover existing levels of expenditure.
- Wastewater tariff adjustments could not be addressed because of unavailability of financial data.

End of Chapter 6: Financial Analysis