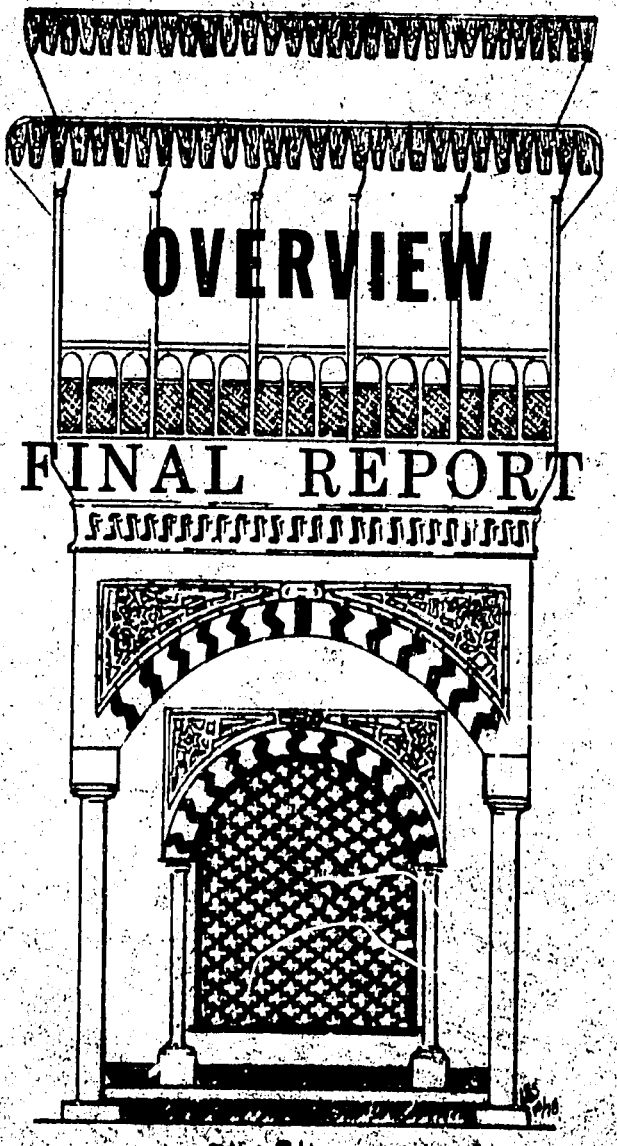
ARAB REPUBLIC OF EGYPT
MINISTRY OF DEVELOPMENT
AND NEW COMMUNITIES

MANAGEMENT AND TARIFF STUDIES RELATIVE TO WATER/SEWERAGE SYSTEMS



OVERVIEW

FINAL REPORT

بسم الله الرحمن الرحيم

وجعلنا من الماء كل شيء حي

صدق الله العظيم

ASSOCIATES WITH HARBOE ASSOCIATES

OVERVIEW

FINAL REPORT

The Story of Our Cover:-

On our cover is a sketch of a sybil, which is a fountain. During the Ottoman Empire these were a common source of drinking water. A well is located at ground level and a balcony on the second level where children were taught the Koran. Usually located near mosques, sybils were built and then donated to the public by various benefactors.

Beneath the sketch is a quote from the Koran, "We made from water all living things".

BLACK & VEATCH INTERNATIONAL
CONSULTING ENGINEERS

A. T. KEARNEY, INC.
MANAGEMENT CONSULTANTS

WITH SABBOUR ASSOCIATES
CONSULTING ENGINEERS

بـــلاك أندفيتش الدوليـــة
استشارات هندسية

أ. ت. كارنى
استشارات إدارية

المكتب الهندسى الاستشاري « صـــبور »
استشارات هندسية

OUR REF.: 79-255
YR REF.:
DATE: October 8, 1979

Engineer Soliman Abd El Hai
Advisory Committee for Reconstruction
Ministry of Development and New Communities
1, Ismail Abaza Street
Cairo, A.R.E.

Dear Engineer Abd El Hai:

Pursuant to the provisions of Section 6.7 of Appendix 1 to the Contract dated April 6, 1978 by and between the Ministry of Housing and Reconstruction and BVI-ATK Associates for Management and Tariff Studies Relative to Water and Sewerage Systems, we are pleased to submit the Final Report on Management Systems - Overview. Together with the Reports covering Section 5.3.5 through 5.3.9, it is responsive to the provisions of Section 5.3.11 of Appendix 1 to the Contract.

We wish to acknowledge the assistance and cooperation of the may individuals, agencies and organizations contacted during the course of the study.

We appreciate the opportunity to serve the Ministry on this important assignement.

Very truly yours
BVI-ATK ASSOCIATES

John R. Scott
Project Director

cc: USAID
TAMS
Mr. A.F. Naguib

3 Ahmed El Borei St. Mohandseen
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٣ أحمد البرعى - مدينة المهندسين

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MANAGEMENT SYSTEMS - OVERVIEW

In the course of the Management Systems Studies, ten separate reports have been prepared (See Exhibit 0.1.):

- Special Report on Management Procedures - Alexandria Water General Authority (AWGA)
- Supplement to Special Report on Management Procedures - Alexandria Water General Authority
- Organizational Environment and Structure
- Physical Assets
- Management Information Systems
- Data Processing
- Procedures and Methods
- Personnel Systems
- Organization Manual
- Management Systems - Overview

To the extent possible, each report has covered a separate and distinct area of management concern. This Overview summarizes the principal elements of each report. For the convenience of the reader, the Executive Summary or appropriate section from each report is included.

1.0 SPECIAL REPORT ON MANAGEMENT PROCEDURES - AWGA

(See Exhibit 1.0 for Background and Executive Summary)

1.1 EXTERNAL CONSTRAINTS

This Study was specifically directed toward the identification of opportunities for improvements in the management of AWGA without altering the external environment within which it must operate. Nevertheless, three severe constraints on the management of AWGA were observed:

- Compliance with the labor law is the greatest obstacle to effective management.
- AWGA is accountable to outside agencies for the means employed rather than the results achieved.
- State Government subsidies are unpredictable and only indirectly related to activity levels and capital needs.

Three constraints have been found to be equally applicable to the other utilities.

1.2 MANAGEMENT PRACTICES

While the external constraints are significant, the management practices at AWGA were found to be deficient in certain key areas. Specifically, managers are:

- Not planning or controlling
- Not managing change, motivating employees or seeking solutions to causes of problems.
- Doing the work of subordinates.
- Following existing procedures regardless of effect.
- Reacting to symptons rather than solving problems.
- Avoiding constructive conflict.

Again, these practices have been found common to a greater of lesser degree at each of the utilities.

1.3 RECOMMENDATIONS

The Report identified a number of key changes that should be made at AWGA, each directed toward increasing management awareness of the need for improved practices. The specific recommendations include the development of:

- Clear statements of policy that identify needed improvements and responsible managers.
- Plans that specify what is to be accomplished, how, when and by whom to focus management attention on the most promising opportunities.
- Controls that will ensure that the planned goals are met and will alert management to problem areas.
- New practices and techniques that will overcome the problems of rising costs and a changing workforce.

While the work content of this Study did not originally include an analysis of AWGA's internal structure, it was concluded that organizational revisions could improve management and the quality of service to customers. Such changes that create new management positions will require the approval of the Central Agency for Organization and Administration (CAOA).

Finally, because of the importance of the recommendations and the potential benefits to AWGA an implementation guide was included as part of the Report.

2.0 SUPPLEMENT TO SPECIAL REPORT ON MANAGEMENT PROCEDURES - AWGA

(See Exhibit 2.0 for Background).

The Supplement was developed following conference with representatives of the Advisory Committee for Reconstruction,

the International Bank for Reconstruction and Development and the management of AWGA.

The Supplement identified and classified the implementation assistance available to AWGA in three categories:

- The detailed Management Systems Studies that have been conducted under the Contract and as subsequently described in this Overview. Copies of the reports have been completed and made available to each concerned organization, including AWGA.

  The recommendations of each study are applicable to AWGA and implementation should start as soon as reasonably possible.

- Part-time implementation assistance included as part of the Contract (Paragraph 5.3.12 of Appendix I). This assistance covered six major Work Improvement Plans:

  - Networks (distribution) efficiency, including improvement of:

    Customer service

    Personnel utilization

  - Budgeting, including:

    The development of better budget estimates

    Commitment by managers to the budgets

    Provision of monthly financial control

  - Meter servicing. A plan has been developed to increase revenues by making certain that meters are working and thereby ensuring accurate billing to customers.

  - Data processing, particularly the definition of a long-term strategy.

  - Training, including the definition and establishment of a training program to remedy present shortcomings.

  - Delegation of authority to provide more authority for middle managers.

- Full-time implementation assistance requested by the management of AWGA in addition to that provided as part of the Contract. During review sessions, AWGA management identified budgeting and cost control as the areas of highest priority.

  A proposal has been submitted to provide such assistance on a turnkey basis; that is, responsibility for the complete design of a budgeting and cost control system as well as implementation will be part of the consulting assistance to be provided.

- There will be significant input from other Management Systems Studies, particularly that on Management Information Systems.

While the implementation assistance being provided is intended for AWGA, the results will be of interest and value to each of the organizations involved in the Management Systems Studies.

3.0 ORGANIZATIONAL ENVIRONMENT AND STRUCTURE

(See Exhibit 3.0 for Executive Summary.)

3.1 SUBJECT AREAS

This Report covers the following subject areas:

- The organizational environment within which the water and sewerage utilities function
- The problems and performance of the individual utilities
- The present organizational structure of the utilities
- Consideration of alternative organizational structures
- Recommended Action Plans and a timetable for implementation

3.2 KEY PROBLEMS

The study identified a number of key problems confronting the utilities, including:

- The inability to attract and retain key personnel because of non-competitive wages and benefits.
- A lack of operational autonomy because of the multiplicity of agencies and levels of government which have direct or indirect powers in the management or supervision of the utilities.
- Insufficient financial autonomy and poor allocation of available resources between projects, personnel, and operations and maintenance.
- An imbalance of resource allocations between potable water and sewerage systems.
- Poor coordination of inter-related development programs at both the local and national levels.
- A declining capability to monitor construction.

- Insufficient policy guidance on key issues such as conservation, coordination of water and sewerage projects, and balances between personnel, operations and maintenance and projects.

- Neglect of necessary research.

- Lack of enforcement of laws and regulations.

- Severe management shortcomings in a number of areas.

- Diminished management effectiveness as a result of inappropriate organizational structures.

- Magnified operating problems as a result of imperfect geographic division of responsibilities.

3.3 RECOMMENDATIONS

The recommendations for solutions to these problems were of two types, limited actions not requiring new legislation and those involving more fundamental solutions.

3.3.1 Limited Actions

The recommendations for limited actions included:

- Measures to improve internal management of the existing utilities.

- Measures to strengthen the organizational structures of existing utilities.

- Improvements in the State budgeting process.

- Measures to improve the coordination of development programs.

- Programs for research on plumbing fittings, Codes of Practices and environmental questions.

3.3.2 Principal Recommendations

The principal recommendations that involve more fundamental solutions included:

- Granting the operating agencies authority to run their own affairs with a minimum of involvement from other agencies.

- Strengthening the financial autonomy of the utilities.
- Strengthening State level coordination and other assistance to utilities.
- A pattern of organizations to avoid the problems of over-decentralization and over-centralization, which would include:
  - . Establishing a Greater Alexandria Metropolitan area.
  - . Establishing separate sewerage utilities in Alexandria and Cairo.
  - . Assigning AWGA responsibility for providing water services to the Greater Alexandria Area and with additional powers to those it presently has.
  - . In the remaining six economic regions of Egypt, establishing independent, combined water and sewerage general organizations or public companies.
  - . In the Suez Canal region, establishing a combined water and sewerage public, wholly-owned by the Suez Canal Authority (SCA) and having access to the facilities of SCA until self-sufficiency is attained.
  - . Alternatively, in the event combination of water and sewerage services is unacceptable in the Suez Canal region, establishing a separate regional water company, wholly-owned by SCA. A separate regional sewerage company or general organization would also be established.
  - . After the establishment of the preceding organizations, combining GOPW and GOSSD into a single general organization for planning and building facilities throughout Egypt, except in Cairo and Alexandria.

3.4 STATUS

Comments and decisions concerning the recommendations of the Report are contained in a letter dated March 12 from the Advisory Committee for Reconstruction. These have been incorporated, as appropriate, in the individual Management Systems reports, particularly the Organization Manual.

4.0 PHYSICAL ASSETS

(See Exhibit 4.0 for Executive Summary.)

4.1 SUBJECT AREAS

This Report examines six categories of physical assets:

- Buildings and Offices
- Warehouses and Storage Yards
- Office Supplies and Equipment
- Supplies and Equipment for Operations and Maintenance
- Communications Equipment
- Transportation Equipment

Each category was reviewed with respect to general suitability and adequacy to support the utilities' present services as well as anticipated future expansions. The control policies and maintenance practices for each category were also studied with specific reference to:

- Record-keeping.
- Scheduling of preventive maintenance.
- Decision-making regarding repair versus replacement.
- Acquisition and disposal practices.

4.2 FINDINGS AND CONCLUSIONS

Except for communications equipment, which is inadequate, the physical assets available to the utilities permit marginally

acceptable levels of service. Relatively, the assets of the wastewater utilities were found to be less adequate to meet future expansion than those of the water utilities.

At all utilities, potential improvements were identified that would provide a better level of service, primarily through more formal control systems and better management of all categories of physical assets.

4.3 RECOMMENDATIONS

Specific recommendations of this Study include:

- Installing a building and real property inventory system.
- Establishing an effective preventive maintenance program for the physical plant and other assets.
- Upgrading of buildings and grounds housekeeping.
- Requiring that managers be held accountable for physical assets under their control.
- Initiating surveys and programs for the acquisition and disposal of assets.
- Installing a system to facilitate repair versus replacement decisions.
- Initiating a modernization program for office supplies and equipment.
- Procuring and installing two-way radio systems.
- Establishing technical libraries for operating plants and laboratories.
- Improving the facilities, tools and equipment for support of operations and maintenance.

Finally, this Study determined that an approximately LE 103 million of additional physical assets will be required by the water and wastewater utilities during the next ten years.

5.0 MANAGEMENT INFORMATION SYSTEMS

(See Exhibit 5.0 for Background and Executive Summary.)

5.1 STUDY OBJECTIVES

The basic study objectives included:

- A review and analysis of existing management information systems.
- Development of a comprehensive but simple and flexible management information system, including:
  - . Periodic reporting from responsibility centers.
  - . A budgeting system.
  - . A system of accounting to provide data for the preparation of financial statements.
  - . A data collection system for planning data.
  - . A data collection system for cost accounting data
- Development of an information system for top management.

5.2 BUDGETING

The Study concludes that the principal objective of the present budgeting process is to obtain funds from the State government. Because it is not based on a careful analysis of needs, the budget cannot be used for control purposes.

The Report recommends a new budget system that requires:

- Establishment of responsibility centers for financial and operational control.
- An operating budget for each Responsibility Center.
- Budget requests based on explicit need.

5.3 CAPITAL PROGRAMMING

Capital programming should be improved at each utility:

- The needs of users have not been met.
- The acquisition and allocation of funds should be better planned.
- Control mechanisms need strengthening.

Recommendations of the Report include the development of:

- Long-range plans that are updated and approved annually.
- Annual capital budgets.
- Planning methods and techniques for monitoring project progress and costs.

Further findings and recommendations concerning project planning are to be found in the Procedures and Methods Report.

5.4 ACCOUNTING SYSTEMS

While the existing accounting systems meet State reporting requirements, they do not provide useful internal cost and productivity information. A new accounting system is recommended which would:

- Place greater responsibility for controlling costs on managers and supervisors.
- Provide data for evaluation of departmental performance.
- Streamline accounting procedures.
- Improve control of assets.
- Permit the gradual introduction of electronic data processing.

5.5 INFORMATION FOR PLANNING AND CONTROL

The existing information systems have serious deficiencies in that they do not:

- Provide enough information for planning.
- Communicate organization goals and plans.
- Encourage efficient use of resources.
- Provide information on a timely basis.
- Focus attention on important decisions.

A comprehensive set of reports has been recommended for each major department.

6.0 DATA PROCESSING

(See Exhibit 6.0 for Background and Executive Summary)

6.1 SUBJECT AREAS

This Study has considered the following subjects:

- The status of electronic data processing in Egypt.
- Data processing activities of the water and sewerage authorities.
- Potential areas for automation and the nature of computing services to be provided.
- The computing strategy to be adopted.
- Potential short-term improvements.

6.2 FINDINGS AND CONCLUSIONS

The principal findings and conclusions of the Data Processing Study are that:

- Data processing equipment is being used at AWGA, GOGCWS and SCA. All procedures at GOSSD are manual.
- SCA has a modern computer but the equipment at AWGA and GOGCWS is obsolete and should be replaced.
- The SCA computer is used for water supply operations as well as other SCA operations.
- The principal areas of application for modern computing methods at the utilities are customer billing and accounting, payroll, inventory control and general accounting.
- The principal benefits to the utilities would be improved speed of processing, accuracy and level of detail that would permit management to make better-informed and more timely decisions. In addition, over 500 clerical staff would be available for reassignment.

6.3 RECOMMENDATIONS

The equipment recommended includes data preparation at the main offices of the various utilities and a single computer located in Cairo to serve the needs of all utilities, except SCA water operations which would continue to be served by the SCA computer center. An alternative would be two computers, one in Alexandria and one in Cairo.

The computer centers should be under the joint control of the utilities. A major problem will be the recruitment of a highly-skilled computer staff, which may require consideration of external specialists or the use of a service bureau.

Approximately four years would be required before all computer systems could be operational. Immediate improvements are possible in the physical presentation of data to be processed and the level of accuracy of input data.

7.0 PROCEDURES AND METHODS

(See Exhibit 7.0 for Executive Summary.)

7.1 SUBJECT AREAS

Procedures and methods were reviewed in five functional areas:

- Project Planning
- Operation and Maintenance of the Waterworks and Wastewater Systems
- Billing and Collecting
- Procurement and Inventory Control
- Mapping and Record-Keeping

Each area was reviewed for the sequence of various work elements and the manner in which work is assigned and controlled.

7.2 FINDINGS AND CONCLUSIONS

Except for physical control of inventory, there is almost a complete lack of any procedures, methods or control over the various areas studied. In each of the utilities there are many improvements that can and should be made to provide control mechanisms for labor management. The higher level of service will result not only in a more efficient and economical operation but also provide motivation to workers through economic and skill recognition.

7.3 RECOMMENDATIONS

Because of the almost complete lack of procedures and methods, a large number of recommendations have been made. The principal, or key, recommendations in each functional area have been identified. Some are identical to those of other reports.

As appropriate, outline descriptions of a number of procedures and methods have been developed, including:

- Work measurement programs.
- Job order systems.
- Long-range planning.
- Material control function.
- Standard operating instructions.

The details and technical content have been developed to the extent of providing a framework for establishing control.

8.0 PERSONNEL SYSTEMS

(See Exhibit 8.0 for Executive Summary.)

8.1 KEY QUESTIONS

This Report, which might more appropriately be called a Report on Human Resources Management, addresses three key questions:

- How well are the utilities managing their human resources?
- Why do they manage their personnel as they do?
- What should be done for improvement?

8.2 MANAGEMENT OF HUMAN RESOURCES

The utilities, except for SCA water operations, are seriously underutilizing their managers, employees and workers. Most employees are working less than half the time; many appear to be never working. At the same time most managers are busy doing work that should be done by their subordinates and many important activities are virtually neglected.

8.3 REASONS FOR POOR MANAGEMENT

There are four basic reasons for this poor management of human resources:

- The laws, particularly Law 58/1971, which have contributed to personnel problems.
- Masked unemployment; that is, the use of government and its various organizations, including the water and sewerage utilities, as employers of last resort for the otherwise unemployables.
- Lack of incentives to work harder and improve job performance.
- Lack of skills at most job levels.

8.4 TYPES OF IMPROVEMENT

The four major types of improvement recommended in this Report include:

- Stopping the unneeded growth of staff.
- Improving personnel systems, particularly with:
  - Incentives.
  - Training.

9.0 ORGANIZATION MANUAL

(See Exhibit 9.0 for Introduction)

9.1 SCOPE

The Organization Manual is divided into sections for each water and sewerage utility. Organization charts have been provided for:

- General Organization for Greater Cairo Water Supply (See Exhibit 9.1.)
- General Organization for Greater Cairo Sewerage and Sanitary Drainage (See Exhibit 9.2.)
- Alexandria Water General Authority (See Exhibit 9.3.)
- General Organization for Alexandria Sewerage and Sanitary Drainage (See Exhibit 9.4.)
- General Organization for Suez Canal Region Water and Sanitary Service (See Exhibits 9.5 - 9.8.)
- National Water Authority (See Exhibit 9.9.)
- National Sewerage Authority (See Exhibit 9.10.)

The Manual also includes:

- A statement of objectives and responsibilities for the utilities.
- A definition of the objectives and functions of each department.
- Job descriptions for each category of key job.
- Recommended staffing levels by type of skill.

9.2 CONSIDERATIONS

The organizational charts in the Manual are based on an evaluation of:

- Major objectives of the organizations.
- Tasks to be performed.
- The degree of specialization required.
- The degree of coordination required.

The recommended organization structure for each utility has a number of noteworthy features:

- The recommended number of vice chairmen for each utility is greater than the present number. This will provide more top management time for planning and policy-making.
- A Customer Service Sector or Department is established for each utility to provide good service to customers.
- A Management Services Department is established for each utility to help the Chairman analyze and research problems and to prepare long-range plans.
- Other changes which will enhance good management practices, e.g., the establishment of a Project Management structure within each utility.

9.3 STAFFING LEVELS

Estimates have been developed of the minimum staffing levels required to operate the facilities that are existing or to be completed during 1980. These are compared with existing levels in the following table:

TABLE 9.1

EXISTING AND MINIMUM STAFFING LEVELS

Utility	Actual	Required - 1980	Percent Overstaffed
Cairo - Water	8,885	4,074	118%
- Sewerage	8,861	7,128	24
Alexandria - Water	3,307	2,217	49
- Sewerage	1,817	1,526	19
Suez Canal - Water	411	671	(56)
- Sewerage	917	914	-
Total	24,198	16,500	47

Except for the Suez Canal Region, the utilities are over-staffed. In general, there are too many laborers and workmen and too few skilled craftsmen, foremen and supervisors.

9.4 IMPLEMENTATION

The organization structures outlined in the Manual are long-term in nature. Immediate implementation may be delayed by:

- Lack of appropriate personnel.
- Job grades of existing personnel.
- Lack of space.
- Entrenched attitudes such as artificial distinctions between administrative and technical personnel.
- Reluctance of some managers to give up some present responsibilities and personnel.

For these reasons, some variations in the recommended structures may be required in the near-term. Nevertheless, the following steps should be taken as soon as possible:

- Establishment of additional vice chairmen positions.
- Establishment of a Customer Service function
- Establishment of a Project Management structure within the Technical Sectors.

CONSULTANT'S REPORTS
MANAGEMENT AND TARIFF STUDIES
RELATIVE TO WATER/SEWERAGE SYSTEMS

Reference Number	Report Title	Contract[1] Reference	Report Submittals
1	Special Report on Management Procedures - AWGA	6.3	Reissued Dec.19, 1978
2	Supplement to No. 1	6.3	Dec.19, 1978
3	Status Report	6.2	Oct. 5, 1978
4	Management Systems: Organizational Environment and Structure - Interim Report	6.4	Dec. 4, 1978
5	Final Report to No. 4	6.7	Not required
6	Management Systems: Physical Assets - Interim Report	6.5	March 12, 1979
7	Draft Final to No. 6	6.6	July 8, 1979
8	Final to No. 6	6.7	October 8, 1979
9	Management Systems: Management Information Systems - Interim Report	6.5	March 15, 1979
10	Draft Final to No. 9	6.6	July 8, 1979
11	Final to No. 9	6.7	October 9, 1979
12	Management Systems: Data Processing - Interim Report	6.5	March 31, 1979
13	Draft Final to No. 12	6.6	July 8, 1979
14	Final to No. 12	6.7	October 8, 1979
15	Management Systems: Procedures and Methods - Interim Report	6.5	April 8, 1979
16	Draft Final to No. 15	6.6	July 8, 1979
17	Final to No. 15	6.7	October 8, 1979

Note: (1) From Appendix 1 to the Contract.

CONSULTANT'S REPORTS - MANAGEMENT AND TARIFF STUDIES RELATIVE TO WATER/SEWERAGE SYSTEMS

Reference Number	Report Title	Contract(1) Reference	Report Submittals
18	Management Systems: Personnel System - Interim Report	6.5	April 8, 1979
19	Draft Final to No. 18	6.6	July 8, 1979
20	Final to No. 18	6.7	October 8, 1979
21	Management Systems: Overview		April 8, 1979
22	Draft Final to No. 21		Not required
23	Final to No. 21		This Report X
24	Organization Manual	6.6	July 8, 1979
25	Final to No. 24	6.7	October 8, 1979
26	Water Utility Tariffs - Interim Report	6.5	April 8, 1979
27	Draft Final to No. 26	6.6	July 8, 1979
28	Final to No. 26	6.7	October 8, 1979
29	Sewerage Utility Tariffs - Interim Report	6.5	April 8, 1979
30	Draft Final to No. 29	6.6	July 8, 1979
31	Final to No. 29	6.7	October 8, 1979
32	Water Utility - Inventory and Valuation - Interim Report	6.5	April 1, 1979
33	Draft Final to No. 31	6.6	July 8, 1979
34	Final to No. 31	6.7	October 8, 1979
35	Sewerage Utility - Inventory and Valuation - Interim Report	6.5	April 1, 1979
36	Draft Final to No. 35	6.6	July 8, 1979
37	Final to No. 34	6.7	October 8, 1979

Note: (1) From Appendix 1 to the Contract.

SPECIAL REPORT ON MANAGEMENT PROCEDURES - ALEXANDRIA WATER GENERAL AUTHORITY

0.0 BACKGROUND AND EXECUTIVE SUMMARY

This Report presents the conclusions and recommendations of BVI-ATK Associates relative to the study of management practices at the Alexandria WaterGeneral Authority (AWGA). The work was performed under a contract of April 6, 1978 with the Ministry of Housing and Reconstruction. It fulfills tasks 5.3.14 and 5.3.15 in the Scope of Work of Appendix 1 to the contract.

0.1 GENERAL BACKGROUND

The total consulting effort of BVI-ATK Associates is directed to improving the effectiveness of Egyptian water and sewerage utilities by recommending changes in two broad areas:

- Management Practices
- Tariff Practices

It is anticipated that a number of reports will be submitted over the 16 months of consulting effort which began June 8, 1978. Exhibit 0.1 shows the titles of these reports and identifies this report, "Special Report on Management Procedures - AWGA".

In six cities of Egypt, water and sewerage utilities are to be studied. The following management subject areas will receive particular attention:

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

- Organizational Environment and Structure
- Personnel System
- Procedures and Methods
- Management Information Systems
- Physical Assets
- Data Processing
- Organization Manual

The purpose of this effort is more than fact-finding and documentation.... it is to introduce beneficial change.

Several steps have been taken to ensure that the recommendations presented here are feasible, practical and beneficial. Some of these steps are:

- Reports of other consultants to the AWGA were studied.
- All of the top management, general managers and many of the middle and lower level managers were interviewed.
- Numerous internal documents and reports were reviewed.
- All conclusions and recommendations were reviewed in detail in a series of seven presentations to AWGA top management.

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

0.2 BACKGROUND OF AWGA

From 1879 to 1958 AWGA was a British company providing water to Alexandria. Between 1954 and 1961, the company was "Egyptianized" which involved the replacement of foreign personnel at all levels with Egyptians and the modification of management procedures to conform with governmental regulations.

In 1961, the company was nationalized, and converted from a corporation to a Public Utility. It was made a General Authority in 1968.

Three individuals currently comprise the top management at AWGA. They are:

Chairman	Mr. Ahmed Amin Shohayeb
Technical Vice Chairman	Eng. Shawky Badros El Dabe
Vice Chairman for Financial and Administrative Affairs	Mr. Mohamed Diab El Attar

These men and 12 others form the Board of Directors which meets monthly.

As a public utility, AWGA's management freedom is limited in four essential areas:

- Rate setting
- Service area
- Outside accountabilities
- Operating procedures

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

AWGA may not set rates of its own accord. The effect of this has been to prevent the organization from achieving financial self-sufficiency.

Areas requiring water service have been annexed to AWGA by decree. The Western Desert is one such area which has proved to be a sizeable financial and operating burden.

AWGA is accountable to numerous governmental agencies for various aspects of its operation; in total, six ministries plus the Governorate of Alexandria.

Several important operating procedures must conform to governmental specifications, particularly in the areas of personnel and financial management.

The problems created by these constraints are discussed in this Report.

In spite of these conditions, AWGA top management is aware of its responsibility for achieving the most benefit possible from the available resources.

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

0.3 SUMMARY OF THIS REPORT

This Report identifies opportunities for improvements in the management of AWGA without altering:

- The legal character of the organization.
- Reporting relationships with external organizations.
- Governmental procedures with which AWGA must comply.
- The capital structure or revenue base.
- The present configuration of services provided.
- Authorities delegated to AWGA by the State Government.

Each of these considerations will be evaluated in subsequent reports in an effort to identify additional improvement opportunities.

Nevertheless, this does not mean that these factors are insignificant. Their impact on the management of AWGA is often severe. This is particularly notable in three areas:

- Compliance with the Government labor law is the single greatest obstacle to effective management encountered in the study.
- AWGA is accountable to outside agencies for the means they employ rather than the results they achieve. This leads to two counter-productive conditions:
  - All AWGA Board of Directors decisions are subject to being over-ruled by outside individuals who are less aware of the import of those decisions. The Board loses the sense of responsibility for its decisions.
  - Management's attention is diverted to procedural adherence rather than to achievement of goals. Poor work practices are rarely changed. Problems are merely observed and documented rather than solved.

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

- State Government financial subsidies are unpredictable and only indirectly related to the activity level and capital needs of AWGA. Therefore....
  - Long-term planning is viewed as futile by AWGA managers.
  - The importance of internal cost control is diluted.
  - The true impact of unrealistic tariffs is hidden, both from management and the consumer.

These problems must be solved before AWGA can begin to realize the full potential of its resources. The report on Organizational Environment and Structure (Exhibit 0.1 - item 4 and 5) will make specific recommendations relating to these problems.

Nevertheless, many opportunities exist for AWGA to improve its performance under the present circumstances. The recommendations presented in this report specifically address those opportunities.

Mr. Shohayeb and his staff have already begun to introduce constructive change at AWGA. The managers at AWGA take their work very seriously and display a high degree of personal integrity. These same managers helped identify most of the problems cited in this report and seem anxious to begin solving them.

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

The managers know that management practices at AWGA have been in a state of atrophy or decline. Managers are not planning or controlling. They are not managing change, motivating employees or seeking solutions to the causes of problems.

Rather they are....

- Personally doing the work of weak subordinates.
- Unquestioningly following existing procedures regardless of effect.
- Continuously observing and reacting to symptoms rather than solving the basic problems.
- Avoiding conflict with employees and peers even when the conflict is warranted.

The correction of these problems will not result from the implementation of several new systems or a sudden increase in the amount of training. Rather, steady and continuous application of good planning and control practices will eventually create the desired changes.

If the management problems at AWGA could be summarized in one word, that word would be awareness.

- Managers must be made aware of their responsibilities.
- They must become aware of their impact on costs.
- They must become aware of the goals they should achieve.
- They must become aware of techniques for solving problems.
- They must become aware of how a manager's job differs from that of his subordinates.

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

All of the recommendations in this Report are directed at increasing management awareness.

Without clear statements of policy, it is difficult to identify needed improvements and responsible managers. This report recommends the creation of AWGA policies....

- Personnel Management
- Financial Management
- Water Quality
- Water Supply
- Rate Setting and Billing
- Cost Control
- Customer Services

Plans which specify what is to be accomplished, how and by whom are needed to focus management attention on improvement opportunities offering the greatest payback.

This report recommends new plans....

- Service Plan
- Operational Strategy
- Work Improvement Plans
- Personnel Management Plans
- Budget Plans
- Cost Reduction Plans

SPECIAL REPORT ON MANAGEMENT PROCEDURES -
ALEXANDRIA WATER GENERAL AUTHORITY

To ensure the planned goals are met, management should be alerted to problem areas and "develop its muscles" to meet common obstacles. Better control tools are needed. This Report recommends new controls....

- Management Indicators
- Control Reports
- Revised Organization Structure
- Production Monitors

New practices and techniques are needed to overcome the problems of rising costs and changing workforce. This Report recommends new practices....

- Cost Accounting System
- Performance Appraisal
- Promotion Procedures
- Management by Results
- Upgrading of Key Skills

Because of the many recommendations and the importance to AWGA of receiving the benefits, a special section is included as an implementation guide.

Sincere assistance and cooperation were provided by Mr. Shohayeb and his staff. If this level of enthusiasm and positive thinking is maintained, AWGA should achieve a successful implementation of these recommendations with the assistance of BVI-ATK Associates.

SUPPLEMENT TO SPECIAL REPORT ON MANAGEMENT PROCEDURES

ALEXANDRIA WATER GENERAL AUTHORITY

This Supplement to the Special Report on Management Procedures for the Alexandria Water General Authority (AWGA) describes the understanding reached with Chairman Shohayeb of AWGA concerning the recommended changes to be implemented. It is organized under the following section headings:

1.0 Background

2.0 Implementation - Management Systems Studies

3.0 Implementation - Part-Time Assistance

4.0 Implementation - Budgeting and Cost Control

1.0 BACKGROUND

The Special Report on Management Procedures - Alexandria Water General Authority dated October 1, 1978 and as reissued December 19, 1978 identified a number of problems and recommended changes in various management procedures:

- Planning
- Operational Controls
- Financial Controls
- Human Resources
- Organization

SUPPLEMENT TO SPECIAL REPORT ON MANAGEMENT PROCEDURES

Following issuance of the Special Report, discussions were conducted with representatives of the Advisory Committee for Reconstruction and the International Bank for Reconstruction and Development as well as management of AWGA. These discussions were directed toward the resolution of comments concerning the Special Report as well as identification of those areas where implementation assistance could be of greatest and lasting benefit to AWGA. In addition, AWGA has discussed its requirements with the Minister of State for Housing

It should be recognized that the Special Report identified the principal problem areas at AWGA and outlined in broad terms the recommendations for solution of these problems. The details and implementation of these recommendations were recognized at the outset of the study as being part of either:

- The detailed management systems studies being conducted under the Contract,
- Part-time implementation assistance included as part of the Contract (Paragraph 5.3.1.6 of Appendix I), or
- Implementation assistance requested in addition to that provided as part of the Contract.

This Supplement to the Special Report describes each type of assistance.

ORGANIZATIONAL ENVIRONMENT AND STRUCTURE

0.0 EXECUTIVE SUMMARY

This Interim Report on Organizational Environment and Structure is a part of the management and tariff studies of water and sewerage systems of Alexandria, Cairo/Helwan, Port Said, Ismailia and Suez. The objective is to design programs for the development of organizations required to meet needs through the year 2000. While the aim of most water and sewerage consulting projects is the solution of operational and engineering problems, this report focuses on management in the broad sense, including the roles of all government agencies which play a part. Its aim is to identify not only problems but also the underlying causes and to suggest long-term solutions, as the Terms of Reference of the study put it, "which will allow the utilities the appropriate degree of autonomy, financial independence and self-supported growth" (Paragraph 5.3.4 of the TOR).

This Report deals with the organizational environment in which the services function, the legislative and regulatory bases and the relationships of the utilities with national and regional govenment agencies. As the contract directs, it examines Government administrative practices and identifies modifications required to enhance the capabilities of the utilities.

The Report also examines the organizational structures of the utilities and their problems and performance. It

reviews the organizational alternatives available to Egypt for the establishment of new organizations or the modification of existing agencies in the light of U.S. and Egyptian experience. It concludes with recommended Action Plans, suggestions on a procedure for implementing the recommendations and a time-table for implementation.

0.1 FINDINGS AND CONCLUSIONS

The following are the principal findings of this Study:

- The utilities are unable to attract and retain key personnel in several categories such as engineering, skilled workers, technicians and managers because of non-competitive wages and benefits. This is increasingly affecting essential functions and is a problem that must be solved if the utilities are to continue to operate.

- Because of the multiplicity of agencies and levels of government which have direct or indirect powers in the management or supervision of the utilities, the utilities do not have the operational autonomy that they require for effective performance. Their freedom of action is limited in such fields as:

  . Long-range planning

  . Budgeting

  . Wages and benefits

  . Organizational structure

  . Job descriptions

  . Construction

  . Accounting systems

- The utilities do not have the necessary degree of financial autonomy in that:

  . They do not have control over rates charged to customers.

  - They are living with the results of a long period of past underfunding.

  - Resources available for projects have been increased but personnel and operations and maintenance are still underfunded. This prevents effective action to solve problems in such fields as maintenance, training, and wages and benefits.

- Fewer resources have historically been allocated to sewerage than to potable water systems and this continues to be the case.

- Coordination of planning of inter-related development programs is poor at local and national levels. Unbalanced funding makes it impossible for housing, water and sewerage projects to move ahead together.

- Effective use of increased resources is threatened by the declining capability to monitor construction because of losses of key personnel. Shortage of contractors is another limiting factor.

- Insufficient policy guidance exists on issues such as:

  - Conservation, which is of major importance because of the huge amounts of water wasted and which acquires actions of many kinds.

  - Coordination of water and sewerage, which is at present minimal.

  - Coordination with other development sectors.

  - Maintaining a balance between operations/ maintenance and projects.

  - Urban/rural interface.

- Necessary research is neglected, including that in:

  - Hydrology.

  - Water and sewage treatment technology.

  - Improved plumbing fittings.

  - Environment.

- Laws and regulations, particularly concerning sewerage, are often not enforced. They include:
  - . Laws on discharge of waste into waterways.
  - . Charges to industry for sewerage services.
  - . Metering of new homes.
- Management shortcomings are present in several utilities in regard to:
  - . Planning of management functions.
  - . Internal monitoring and control.
  - . Pursuit of cost effectiveness as a goal.
  - . Delegation of authority.
  - . Personnel management.
  - . Project management.
  - . Customer relations.
- Management effectiveness is diminished by:
  - . The existence of too few major line divisions.
  - . Insufficient use of geographic divisions.
  - . Absence of divisions for customer relations and project management.
- Operating problems are magnified by imperfect geographic division of responsibilities, for example:
  - . Over-centralization of sewerage in GOSSD.
  - . Over-decentralization of water and sewerage services to small governorates, cities and towns.

0.2 PROGRAM OF LIMITED ACTIONS

Recommendations for solutions are divided into a program of limited actions not requiring new legislation and a program including more fundamental solutions. The

program of limited actions includes:

- Measures to improve the internal management of the existing utilities.
- Measures to strengthen the organizational structures of existing utilities.
- Improvements in the State budgetary process aimed essentially at raising the priority assigned to Parts 1 and 2 of budgets to permit solution of problems relating to benefits, training, maintenance, research, public relations, policy planning and changes in organizational structure.
- Measures to improve coordination of inter-related elements of development programs at local and State levels.
- Programs for research on plumbing fittings, Codes of Practice for the building trades and environmental questions to be undertaken by already existing agencies.

0.3 PRINCIPAL RECOMMENDATIONS

The study concludes that in Egypt private ownership of utilities is not a feasible option and direct operation by central government agencies has proved ineffective. The combination of water and sewerage in single utilities is desirable for the efficiences that it makes possible in planning, construction, maintenance, repairs and the use of technical personnel in short supply. Nevertheless, strong resistance to combination exists among potable water agencies. In Cairo and Alexandria, the difficulties of combining in the immediate future would be compounded by the magnitude of the capital projects under way or soon to be undertaken and the degree to which sewerage systems have failed to keep pace with water systems because of lack of budgetary support. The conclusion reached is that

while combination of water and sewerage in those cities should be the intermediate-term objective, it is not practicable in the near-term. Combination could be immediately achieved in the new regional utilities agencies recommended for establishment in Egypt's six other regions. In addition, there appears to be informal acceptance of immediate combination of GOPW and GOSSD as they would remain following implementation of the other recommendations in this report.

The major recommendations of the Study call for:

- Granting the operating agencies authority to run their own affairs with a minimum of involvement from other agencies either by:

  nending their basic statutes to give ıem decision-making powers on wages and benefits, organizational structure, job descriptions, personnel management and accounting systems, or

  Establishing them as public companies.

- Strengthening the financial autonomy of the utilities by:

  . Instructing them by statute to operate at a profit (including subsidies).

  . Revising the rates they charge to customers to levels which cover operating expenses and the cost of repaying debt incurred for capital projects.

  . Establishing a permanent independent National Public Utilities Rate Commission to hear applications from utilities for rate changes and make decisions applying criteria established by law or regulation. Final decisions on the application of Commission recommendations would be at the political level. For social or political reasons the State might decide to subsidize a portion of the charges, such as those for low income families.

- Strengthening State level coordination and other assistance to utilities by establishing a full-time High Commission for Water Resources, Planning, Research, Design and Enforcement having a permanent staff of experts. Decision-making authority would rest with a board composed of the chairmen of the operating agencies and planning organizations, and representatives of interested ministries and outside experts. The Commission would:

  - Serve as a focal point for discussion and coordination of national land and water resources planning.

  - Prepare policy studies to support decisions of the High Sectoral Council for Housing and Utilities, the Cabinet or the People's Assembly.

  - Contract for research programs.

  - Collate statistics on water resources.

  - Enforce utilities laws, regulations and policies throughout the nation.

  - Prepare public education programs (for example, relating to water conservation).

To avoid the problems of over-decentralization and over-centralization, the following pattern of organizations is recommended:

- A Greater Alexandria Metropolitan Area should be established, following the example of Cairo, the boundaries of which would extend beyond the anticipated point of city growth through the year 2000.

- In Alexandria and Cairo separate, independent sewerage general organizations or public companies should be established having in each case responsibility for planning, building, operating and maintaining sewerage services throughout the greater metropolitan area.

- In Alexandria, AWGA should be responsible for planning, building and operating water services for the Greater Alexandria Area, either as a public company or as a general organization with powers in addition to those it now has.

- In the remaining six regions of Egypt independent, combined water/sewerage general organizations or public companies should be established to take over all water and sewerage operations and maintenance from the governorates, towns and other agencies which now operate them. The boundaries of these utilities regions should be based upon the needs of utilities operations even if in some cases this means departing from the boundaries of the planning regions already established. The regional organizations would not initially be responsible for planning and construction. Each would undertake these functions at such time in the future as it was in a position to do so.

- In the case of the Suez Canal region, a combined water/sewerage public company should be established wholly-owned by the Suez Canal Authority and continuing to have access to the special facilities of the Authority for an initial period until self-sufficiency is attained.

- If combination of water and sewerage in the Suez Canal regional company is unacceptable, a separate regional water company should be established wholly-owned by the SCA. In this event a separate regional sewerage company or general organization should also be established.

- GOPW and GOSSD, as modified following the establishment of the above organizations, should be combined into a single general organization for planning and building major facilities throughout Egypt, except in Cairo and Alexandria. The facilities would be turned over to the regional organizations upon completion.

PHYSICAL ASSETS

0.0 EXECUTIVE SUMMARY

Under a contract dated April 6, 1978 with the Ministry of Housing and Reconstruction, BVI-ATK Associates have conducted management and tariff studies relative to water and wastewater utilities in Egypt. The Management Study consists of eight interrelated studies, each involved with particular areas of management concern. This Report documents the findings, conclusions and recommendations developed relative to the physical assets of the utilities.

Six categories of physical assets were reviewed from a management perspective:

- Buildings and Offices
- Warehouses and Storage Yards
- Office Supplies and Equipment
- Supplies and Equipment for Operations and Maintenance
- Communications Equipment
- Transportation Equipment

Each was reviewed with respect to general suitability and adequacy to support the utilities' present and anticipated future expansions of services. The control policies and maintenance practices for each category were also studied with specific reference to:

- Record - keeping.
- Scheduling of preventive maintenance.

- Decision-making regarding repair versus replacement.
- Acquisition and disposal practices.

Recommendations have been developed which include improvements that should be made pending implementation of a new organizational structure (interim period), and improvements which are longer range or are required to properly support the new organizational structure during the next ten years (long-term). Approximate amounts, general types and estimated costs of additional assets required during the next ten years have also been developed for use in the valuation of future assets.

0.1 FINDINGS AND CONCLUSIONS

Except for communications equipment, which is inadequate, the assets available to the water and wastewater utilities permit marginally acceptable levels of service. Relatively, the assets of the wastewater utilities are less adequate to meet future expansion than are those of the water utilities. In both types of utilities and at all locations many improvements can and should be made by the existing organizations to provide a higher level of service more efficiently and economically. The improvements are basically in the area of instituting more formal control systems and better tools for management of all categories of physical assets.

PHYSICAL ASSETS

0.2 RECOMMENDATIONS

The principal recommendations of this Study are:

- Property management. Install a buildings and real property inventory system as described in the Report to improve:
  - Property accountability.
  - Property management.
  - Future planning.
- Preventive maintenance. Provide emphasis and resources to establish an effective program for maintaining the physical plant and other assets of the utilities.
- Building and grounds housekeeping. Provide continuing emphasis and interest to upgrade plant and local work conditions.
- Accountability. Require managers to acknowledge receipt of office supplies and equipment, transportation equipment and other property under their control on an annual basis.
- Acquisition and disposal. Initiate surveys to determine new equipment needs for office, operations and maintenance, and transportation equipment. Institute programs to identify and dispose of excess and salvage property in a timely manner.
- Repair versus replacement. Install a system to facilitate making decisions based on costs of repair versus replacement.
- Office supplies and equipment. Initiate a program of gradual modernization.
- Communications equipment. Procure and install two-way radio systems in the operating departments on a priority basis to enable the utilities to provide more responsive and efficient service.
- Plant operations support. Establish technical libraries at operating plants and laboratories.

PHYSICAL ASSETS

- Operations and maintenance support.
  - Provide complete, equipped shop facilities in all capital programs for new plants and plant expansions as required.
  - Follow-through on procurement of tools and equipment recommended in engineering consulting studies.

The Report includes outline descriptions of several recommended property management-related improvements:

- Inventory system
- Preventive maintenance program
- Buildings and grounds housekeeping program
- Repair versus replacement policy and procedures for transportation equipment.

The additional physical assets required by the utilities during the next ten years are projected to total approximately LE 103 million divided approximately 56% for the water utilities and 44% for the wastewater utilities. This total includes approximately LE 27 million of expendable office supplies and supplies for operations and maintenance that would be used during the period.

MANAGEMENT INFORMATION SYSTEMS

0.0 BACKGROUND AND EXECUTIVE SUMMARY

This Report presents the findings, conclusions and recommendations of BVI-ATK Associates concerning Management Information Systems in the major water and sewerage utilities of Egypt. The work was performed under a contract dated April 6, 1978, with the Ministry of Housing and Reconstruction. It fulfills Task 5.3.7 in the Scope of Work of Appendix 1 to the Contract.

0.1 GENERAL BACKGROUND

This Report is one of a series of reports. Each recommends improvements in the management practices and tariff structures of the utilities.

The organizations studied were:

- Alexandria Water General Authority (AWGA).
- General Organization for Greater Cairo Water Supply (GOGCWS).
- General Organization for Sewerage and Sanitary Drainage (GOSSD).
- Suez Canal Authority water departments (SCA).
- Sewage operations of the following governorates:
  - Suez
  - Ismailia
  - Port Said

The purpose of these reports is to enable the organizations to plan, control and finance their activities more effectively. This Report focuses on planning, budgeting, control and communication of information among managers.

Steps have been taken to ensure that the recommendations presented here are practical and beneficial. Some of these steps were:

- Reports of other consultants to the utilities were studied.
- Members of top management, general managers and many middle and lower level managers were interviewed in each major organization.
- Numerous internal documents and reports were examined.
- Relevant literature and government documents were reviewed.

0.2 OBJECTIVES

The outputs of this study, as summarized from the Scope of Work, include:

- A review and analysis of the existing management information systems.
- The design of simple and flexible management information systems including:
  - An improved budgeting system.
  - An improved accounting system.
  - A data collection system that will supply data for:
    - Capital budgeting.
    - Operations budgeting.
    - Financial and cost control.
    - Operations control and evaluation.
  - Reports that permit systematic monitoring of financial and non-financial performance compared to plans.
- The design of an information system for top-level management.
- Recommendations for improvements that can be made in the existing systems before the recommendations of the Organizational Environment and Structure Study are implemented.

0.3 PERSPECTIVE

Good information systems help managers plan and control the performance of an organization. These systems should:

- Provide information for planning.
- Communicate the goals and plans of the organization.
- Promote coordination of efforts among managers.
- Assist evaluation of the performance of the organization and its managers.

Information systems can only provide information. If managers do not plan, make good decisions or take corrective action when results do not meet the plan, then even excellent information systems will provide few benefits to the organization

Information comes in many forms:

- Written reports that are prepared on a regular basis
- Verbal discussions and reports
- Log books and forms
- Irregular written reports

This Study considers the regular reports that enable managers to plan and control the work.

In general, verbal discussions, log books and forms provide the data required to do the work. Management may occasionally require one-time or irregular reports to meet unusual planning or control needs. These types of information, though reviewed when appropriate, are not the subject of this Study.

Throughout this Report, a distinction will be made between data and information. Data are numbers or words that must be rearranged, analyzed or abstracted before they become useful to the decision maker. Information is data that has been analyzed and arranged so that it is directly useful to the decision maker.

0.4 EXECUTIVE SUMMARY

This Paragraph summarizes the findings, conclusions and recommendations of the Study. This summary follows the same order as the remainder of the Report.

0.4.1 Budgeting

The principal objective of the present budgeting process is to obtain funds from the central government. The existing budget cannot be used for control because the:

- Allocation of expenditures is not decided.
- Timing of expenses is not estimated.
- Basis of need for expenses is not presented.

The proposed budget system requires:

- Establishment of responsibility centers so that responsibility for financial and operational control is clearly assigned.
- An operating budget that is divided into months for each Responsibility Center.
- Budget requests based on explicit analyses of need rather than on last year's budget, the anticipated increase in production plus inflation.

MANAGEMENT INFORMATION SYSTEMS

0.4.2 Capital Programming

Until recently, only small amounts of capital were available to the utilities. Now that capital has become more available, foreign consultants have been engaged at each of the major utilities to prepare master plans for water and sewerage facilities.

Capital programming should be improved at each utility:

- Needs of customers have not been met. The primary reason has been lack of funds, but lack of long-range planning has also been a factor.
- Acquisition and allocation of funds should be better planned. None of the utilities has a well-defined process for planning its capital program. Budgeting is hampered by lack of guidelines, poor justification of projects and inappropriate time frames set by the State.
- Control mechanisms need strengthening. Projects have not been designed to simplify the control task. Progress reporting depends on the judgement of engineers rather than on an analysis of measurable results.

Recommendations include:

- Developing a long-range plan that is updated and approved annually by the Board of Directors.
- Preparing an annual capital (not just project) budget.
- Analyzing in detail the tasks for each major project. The analysis should permit accurate assessment of progress and costs incurred at regular intervals during the project.
- Following and forecasting project progress and costs and departmental performance through regular reports.

0.4.3 Accounting Systems

The existing systems meet external reporting requirements but they do not provide useful internal cost and productivity information. The accounting system requires careful checking for mathematical accuracy and signatures on transactions. More important questions such as the following are not answered:

- Is the appropriate amount being expended?
- Are assets well controlled?
- Is the right planning information available?

Because of the many defects and inefficiencies of the present systems, completely new accounting systems should be developed. These systems would:

- Place greater responsibility for controlling costs on operations managers and supervisors.
- Provide data for evaluation of departmental performance.
- Streamline accounting procedures.
- Improve control of assets.
- Permit the gradual introduction of electronic data processing.

0.4.4 Information for Planning and Control

The existing information systems have serious deficiencies. They do not:

- Provide enough information for planning.
- Communicate goals and plans of the organization.
- Encourage efficient use of resources.
- Provide information on a timely basis.
- Focus attention on important decisions managers must make.

A comprehensive set of management reports is recommended for each of the major operating and staff departments. These reports include both financial and operating information. Summary reports of performance against plan should be circulated to top management. A complete description of each report (purpose, format, preparer, receivers, sources, frequency and timing) is included.

DATA PROCESSING

0.0 BACKGROUND AND EXECUTIVE SUMMARY

This Data Processing Report has been prepared in accordance with the terms of reference supplied to BVI-ATK Associates by the Ministry of Development and New Communities of the Arab Republic of Egypt. It forms part of a series of reports on water and sewerage management practices at:

- General Organization for Greater Cairo Water Supply (GOGCWS).
- Alexandria Water General Authority (AWGA).
- Suez Canal Authority (SCA).
- General Organization for Sewerage and Sanitary Drainage (GOSSD).

A detailed review has been carried out concerning the methods of data processing in the existing organizations. Local conditions have been examined and taken into account when considering the manner in which data processing should be carried out and potential computer applications have been identified in line with the anticipated future needs of the authorities.

Various alternative methods of applying computers to the work of the authorities have been considered and recommendations have been made concerning the most appropriate method for providing computer services.

Recommendations for short-term improvements in existing data processing procedures have been made consistent with the long-term strategy proposed.

0.1 EXISTING DATA PROCESSING PRACTICES

Data processing equipment is currently applied at GOGCWS, AWGA and SCA to carry out several main types of work concerned with the administration of water supply. These are shown in Table 0.1 below. No data processing equipment is used at GOSSD.

TABLE 0.1

MAIN TYPES OF WORK FOR WHICH DATA PROCESSING EQUIPMENT IS USED

Application	GOGCWS	AWGA	SCA
Customer Water Billing	X	X	X
Payroll	X	X	X
Inventory Accounting		X	X
Costing			X

The volumes of information to be processed for these types of work vary considerably between authorities. GOGCWS and AWGA have water billing loads of approximately the same size, but GOGCWS supplies a much larger population and has a payroll substantially larger then AWGA. In terms of the water operations alone, the volume of data processed by SCA is much smaller than that of GOGCWS or AWGA.

Each authority uses different equipment. At SCA a computer is available in Ismailia and is used to provide a centralized service. In Cairo GOGCWS also provides a centralized service, using punched card processing equipment. AWGA uses several types of machines to provide a centralized service in Alexandria for payroll and stock accounting, and a service which is largely decentralized at branches for customer water billing.

DATA PROCESSING

The computer system at SCA is modern and is well-suited to carrying out the work required of it. The computer facility provides services not only for the water operations of SCA but also for Navigation and other departments. Payroll, inventory accounting and costing applications are standardized and are used throughout the Authority. Input information is transported from offices in Port Said, Suez and Ismailia to the computer center and is prepared and processed there. The results are distributed by the same method.

The punched card installation at GOGCWS is now rapidly becoming obsolete and equipment failures are the cause of some erroneous results being provided to users. Input documentation is supplied to the punched card center, where it is key punched and processed.

The data processing facilities at AWGA are, with some exceptions, generally in need of replacement. Over 80% of the customer billing work is done on machines which are over 20 years old.. The machine doing the payroll and inventory accounting work is now eight years old and its performance is beginning to deteriorate. The exceptions are eight billing machines which have recently been purchased, but these are currently failing to achieve the expected processing rates.

DATA PROCESSING

It is clear from the investigations that the equipment at GOGCWS should be replaced as soon as possible, since the errors which it generates require clerical effort to detect and eliminate. The majority of the old AWGA equipment should be replaced because the maintenance costs are becoming unacceptably high. Additionally, the disappointing performance of the new billing machines at AWGA should be investigated.

0.2 RECOMMENDED EQUIPMENT AND APPLICATIONS

The water operations of SCA should for the present time continue to be served by the SCA computer center, and new computer facilities should be procured to meet the needs of GOGCWS, AWGA and GOSSD or the authorities to be located in Cairo and Alexandria.

The equipment to be provided would consist of:

- Data preparation equipment to be located at the main offices of the authorities.
- A single computer in Cairo to provide a centralized computer service.

The business applications for which the computer would be used are:

- Customer Billing and Accounting, for the water authorities.
- Payroll and Labor Cost Accounting.
- Inventory Control and Accounting.
- General Accounting.

The computer should also be capable of technical applications within the time available

0.3 CONTROL, STAFFING AND MANAGEMENT

The computer center should ideally be under the joint control of GOGCWS, AWGA and GOSSD, but in any case the authorities should be represented on the governing board of the computer center. This will ensure that the authorities are able to take appropriate action to maintain a high-quality service.

It is necessary to use highly-skilled computer staff if a reliable service is to be obtained. Special payment arrangements for employees should be investigated with the objective of making salaries available which are close to those in the private sector, thus reducing the likelihood of fast turnover of staff.

Consideration should be given to using the services of external specialists to assist in setting up and operating the computer center, and in training new computer personnel. These specialists could be hired under a facilities management contract.

0.4 SYSTEMS DESIGN AND PROGRAMMING

A reputable external software company should be hired for the work of system design and programming for the authorities. A substantial amount of standardization appears possible and this would be promoted economically by using a single company to carry out this work.

DATA PROCESSING

0.5 COSTS WHICH WILL BE INCURRED

All equipment should be rented with an option to purchase during the introductory phases of the systems development and operations. On this basis the general levels of external costs incurred in setting up the recommended systems to meet the current work loads of the authorities will be as shown in Table 0.2:

TABLE 0.2

EXTERNAL DATA PROCESSING COSTS

Once-Only Charge	
- Systems Design and Programming	LE 102,000
Annual Charges	
- Equipment Rental and Maintenance	LE 122,000
- Computer Operations Staff and Management	LE 24,000
Total Annual Charges	LE 146,000

These costs would be allocated to the authorities as shown in Table 0.3 on the following page. In the report on Organizational Environment and Structure it is recommended that Cairo and Alexandria should have separate sewerage organizations. If the recommendation is accepted then the GOSSD costs would be transferred to these organizations.

DATA PROCESSING

TABLE 0.3

EXTERNAL COSTS ATTRIBUTABLE TO AUTHORITIES (LE)

Cost Factor	Present Organizations			
	GOGCWS	AWGA	GOSSD	All Organizations
Once-Only Costs	(LE)	(LE)	(LE)	(LE)
Systems Design and Programming	38,000	38,000	26,000	102,000
Annual Costs				
Equipment Rental and Maintenance:				
- Data Preparation	26,000	20,000	16,000	62,000
- Processing	28,000	19,000	13,000	60,000
Computing Operations Staff and Management	11,000	8,000	5,000	24,000
Total Annual Costs	65,000	47,000	34,000	146,000

0.6 BENEFITS OF USING A COMPUTER

The main benefit which will be obtained by introducing well-planned computer procedures at the authorities is that the output information provided for management purposes will be much more accurate, timely and detailed. Management will have a tool for greatly improved decision-making and control.

A secondary benefit is that it will be possible to reassign to other tasks many staff at present carrying out routine clerical work. Preliminary estimates show that in each authority over 150 personnel could be transferred to more useful work with the introduction of computer processing.

External costs which are currently being incurred using the present equipment will be eliminated and will assist in justifying the use of new equipment in direct financial terms as shown in Table 0.4:

TABLE 0.4

EFFECT OF NEW EQUIPMENT ON ANNUAL EXTERNAL COSTS AND STAFFING

Cost and Staffing	Present Organizations			
	GOGCWS	AWGA	GOSSD	All Organizations
Present annual external data processing costs (LE)	26,000	53,000	-	79,000
Estimated annual external data processing costs, using new equipment (LE)	65,000	47,000	34,000	146,000
Increase in annual costs (LE)	39,000	(6,000)	34,000	67,000
Net staff available for reassignment to other work	195	192	167	554

AWGA can justify economically the use of improved computing facilities. The maintenance charges on the present equipment at AWGA more than cover the rental and maintenance costs which would be attributable to using the new equipment. In addition about 192 personnel would be available for reassignment to other work.

Although GOGCWS will incur additional annual external costs under the new procedures, the present equipment urgently requires replacement and additional costs are to be expected. Since the additional cost of about LE 39,000 per year enables 195 clerical personnel to be reassigned to other work, the benefits are large.

GOSSD will incur additional annual external costs of about LE 34,000 per year, which is the equivalent of 70 personnel at LE 40 per month. The number of personnel who could be reassigned to other work would be about 167, and consequently the benefits of applying computer procedures are large. Under the proposed organizational arrangements 20% of this number would be available from Alexandria and the remainder from the main office in Cairo.

0.7 SCHEDULE FOR INTRODUCTION OF PROCEDURES

It is most unlikely that all the computer systems can be operational, for all authorities, in a period much less than four years from the start of systems design. It would be possible however, to introduce selected systems at individual authorities and to have at least one application operational at each authority within about two years from the start of systems design.

0.8 ALTERNATIVE COMPUTING STRATEGY

It may prove difficult or impossible to make suitable arrangements for the authorities jointly to control and operate a single computer facility. We consider that the next best alternative would be to have two computers, one in Alexandria and one in Cairo. If the present organizational structure is retained then AWGA would use the computer in Alexandria and the computer in Cairo would be shared by GOGCWS and GOSSD. If the proposed organizational structure is to be used then each of the water and sewerage authorities in Alexandria and Cairo could use joint computer facilities.

In adopting this approach the annual costs involved would be larger overall than for a single installation. It would also be necessary for the management of each facility to obtain skilled computer staff and to be able to retain them within their payment structure, or alternatively to use some form of external service to operate the computer.

At the same time, the alternative strategy might consider other local data processing requirements (e.g., Alexandria city and harbor requirements) to broaden the base of computer applications. In this situation it may be possible to reduce the costs of data processing to the water and sewerage organizations to a level comparable with that available from a single computer facility in Cairo serving these organizations.

0.9 SHORT-TERM IMPROVEMENTS REQUIRED

The main area in which immediate improvements could usefully be made relates to GOGCWS, SCA and, to a lesser extent, AWGA. It concerns the physical presentation of data to be processed and also the level of accuracy of the data at the start of processing. A significant amount of effort is currently devoted to checking all data processing output because of lack of control over input data. Recommendations have been made to assist in eliminating this problem.

PROCEDURES AND METHODS

0.0 EXECUTIVE SUMMARY

On April 6, 1978 the Ministry of Housing and Reconstruction and BVI-ATK Associates entered into a contract to perform management and tariff studies relative to water and wastewater utilities in Egypt. There are eight interrelated studies in the management section, each of which deals with particular areas of management concern. This report presents the findings, conclusions and recommendations developed concerning existing procedures and methods being used in the water and wastewater utilities.

Procedures and methods were reviewed in five functional areas:

- Project Planning
- Operation and Maintenance of the Waterworks and Wastewater Systems
- Billing and Collecting
- Procurement and Inventory Control
- Mapping and Record-Keeping

Each area was reviewed for the sequence established for various work elements and the manner in which the work is assigned and controlled. Particular emphasis was directed toward controls, utilization and efficiency with specific reference to:

- Control systems
- Skill utilization
- Work methods
- Work measurement
- Work standards
- Tools and equipment

PROCEDURES AND METHODS

Recommendations presented have been developed to emphasize the process by which methods and procedures are developed, implemented and controlled. The interim period was selected as the time during which improvements could be made to the existing organizations to establish control until the new organizational structure selected is implemented. The long-range recommendations were developed to support not only the new organizational structure but also to improve the functioning of systems, methods and procedures.

0.1 FINDINGS AND CONCLUSIONS

With the exception of the physical control of inventory, there is almost a complete lack of any procedures, methods or control over the various areas studied. The ability of the utilities to function as well as they have has only been because of the selfless dedication of a number of individuals throughout the organizations involved in this Study. In all utilities there are many improvements that can and should be made to provide control mechanisms which establish the foundation for labor management. A higher level of service will result not only in a more efficient and economical operation but provide an environment of motivation to the worker through economic and skill recognition.

PROCEDURES AND METHODS

0.2 RECOMMENDATIONS

Because there is an almost complete lack of procedures and methods, the recommendations of this Study are many. The principal, or key, recommendations in each functional area are:

- Project Planning
  - . Establish a formal project planning function.
  - . Implement a work measurement program.
  - . Establish formal long-range planning.
  - . Develop planning tools and techniques.
  - . Establish formal written procedures.
- Operation and Maintenance
  - . Develop effective organizational structures.
  - . Establish training programs.
  - . Develop methods improvements.
  - . Implement standard operating instructions.
  - . Establish preventive maintenance programs.
  - . Establish standards of performance.
- Billing and Collecting
  - . Establish training programs.
  - . Initiate meter testing, rotation and repair.
  - . Implement recommendations presented in the Data Processing Report.
  - . Resolve policy differences and eliminate current billings due from Government and public agencies.
  - . Review existing practices for new and renewed accounts.
  - . Implement standard operating instructions.

PROCEDURES AND METHODS

- Procurement
  - . Define duties, responsibilities and authority; document and publish.
  - . Develop a procedures manual.
  - . Review the existing purchasing process for streamlining.
- Inventory Control
  - . Eliminate current back-logs of equipment and material awaiting receiving inspections.
  - . Evaluate existing main store locations to optimize service distribution services.
  - . Conduct an extensive housekeeping program.
  - . Eliminate obsolete and scrap material and equipment.
  - . Develop standard operating instructions.
- Stores Management
  - . Implement material control functions.
  - . Implement recommendations made in the Data Processing Report.
  - . Develop standard operating instructions.
- Mapping and Record-Keeping
  - . Inventory existing maps, drawings and records.
  - . Implement a mapping and records control system.
  - . Implement a new mapping/drafting request system.
  - . Develop a map release control system.
  - . Develop a change order control system.
  - . Establish a mapping and record-keeping organization.

PROCEDURES AND METHODS

The Report includes outline descriptions of several procedures and methods:

- Work measurement programs
- Work order system
- Long-range planning
- Material control function
- Standard operating instructions

The details and technical content of the procedures and methods presented have been developed to the extent of providing a framework for establishing control. The detailed elements can be developed by the personnel interviewed during the course of the Study. Simple guidelines and implementation assistance would initiate an effective program for all the utilities.

PERSONNEL SYSTEMS

0.0 EXECUTIVE SUMMARY

This Final Report on Personnel Systems is a part of the management and tariff studies of the sewerage and water systems of Alexandria, Cairo/Helwan, Ismailia, Port Said and Suez.

This Report contains a summary of the results to date of thorough study and analysis of the development, utilization and management of the human resources (manager, employees and workers) of the utilities. Consequently, it might more appropriately be titled a Report on Human Resources Management.

Egypt has entered a new era. The coutry now has a number of large complex organizations which produce products or perform services. The water and sewerage utilities are such organizations. There are only a small number of historical examples or role models for today's Egyptian managers, employees and workers to follow. A whole new set of values, skills, work habits and ways of thinking must be practiced for these organizations to be successful.

Good engineers, craftsmen or operators are valuable and scarce resources but much of their skill and talent is wasted. Little serious effort is made to manage effectively and develop the utilities' human resources. Current methods are not working.

This Report sets forth a total program that will help the utilities manage, develop and utilize their human resources more effectively. There are detailed recommendations of what things should be changed and how to change them to develop the new values, skills, work habits and ways of thinking that are needed.

0.1 MANAGEMENT OF HUMAN RESOURCES

The utilities, except for the SCA water operations, are seriously underutilizing the work time and talents of most of their managers, employees and workers.(See Section 3.0.) Personnel in the Suez Canal Authority water operations are used fairly effectively.

In AWGA, GOGCWS, GOSSD and the sewerage operations of the Canal city governorates:

- Most of the employees are productively employed less than 50% of the time.
- Many employees virtually never appear to be working.
- While most managers are busy, much of their time is spent doing work that should be done by their subordinates.
- Many are working in tasks below their ability level.

Unfortunately, while many people are so underutilized, there are very important activities that are being neglected:

- Maintenance
- Housekeeping
- Safety
- Improving operations
- Planning
- Problem solving and prevention

These problems continue to grow worse. During the last five years, worker productivity has continued to decline in the utilities. (Each of the above is discussed further in Paragraph 3.1)

0.2 REASONS FOR POOR MANAGEMENT

There are four reasons for this poor use of the utilities' human resources:

- Laws
- Masked unemployment
- Lack of incentives
- Lack of skills

The laws, particularly Law 58/1971, have contributed to these personnel problems. Law 58/1971 was superseded by Law 47/1978, the Civil Service Labor Law, in July 1978. Law 47 was an improvement over Law 58 in some ways; it was not in others. Some of the most significant improvements are:

- Allowing larger salary increases for persons with excellent performance ratings.
- Allowing some promotions to be made on the basis of selection of persons with excellent performance ratings instead of always promoting the most senior person who meets the minimum qualifications.
- Increased use of classification of the job instead of the job holder's education level in determining financial grades.
- Raising the minimum and maximum pay for each financial grade (salary range).

Some of the effects of the new law are harmful, at least for the water and sewerage utilities, in the following areas:

- Combination of salary grades which eliminated three salary grades needed by the utilities
- The long periods of time (five to eight years) which are the minimum times for promotion to Grades 1 through 5

Various aspects of the labor law are discussed in greater detail in Section 2.0.

PERSONNEL SYSTEMS

It is noteworthy that SCA is not subject to all of the constraints of the Civil Service Labor Law. SCA's human resources management and utilization are definitely superior to those of the other utilities.

Past state governments have made the government and its various organizations employers of last resort. The current government recognizes the need to stop pushing this masked unemployment on government organizations. (See the Five-Year Plan, 1978-1982, The General Strategy for Economic and Social Development, Volume One). Nevertheless, there are still pressures operating to encourage the utilities to hire unneeded personnel.

The management of the utilities must work diligently over the next several years to eliminate this masked unemployment from their organizations. Otherwise, the utilities will not be able to meet the demands for improved quantity and quality of service. Much of this Report deals with this major problem.

The third major reason for the poor use of human resources is lack of incentives. Managers have not had adequate incentive to work to overcome the problems created by the labor laws and masked unemployment. Since personnel have not been rewarded for job performance, they have not had the incentive to work harder and to improve their skills and knowledge to do a better job.

The final important reason is lack of skills. None of the utilities except SCA have effective training programs and a high percentage of new employees and workers do not have the needed job skills. The lack of skills exists at most job levels from treatment plant operators to managers.

0.3 IMPROVEMENTS NEEDED

There are four major types of improvements in human resource management needed by the utilities:

- Stop the unneeded growth in staff. (See Section 5.0.)
- Improve personnel systems, particularly:
  - . Incentives. (See Section 4.0.)
  - . Training. (See Section 6.0.)
- Improve management climate. (See Paragraph 4.1.1.)
- Upgrade the personnel departments. (See Paragraph 4.1.7.)

The recommendations to stop the unneeded growth in staff and to improve incentives and training depend on one another for success. They should be looked at as detailed parts of one larger recommendation because:

- The utilities will not be able to stop the growth in the number of unnecessary personnel without better training to upgrade staff skills and knowledge.
- Incentives are needed to motivate employees to learn from and apply training to improve job performance.
- Incentives are needed to motivate managers, employees and workers to apply themselves more diligently and to use their skills and knowledge more fully to improve their organizations.

0.3.1 Growth in Staff

Freeze personnel levels at the number of jobs approved in the 1978 budget for AWGA, GOGCWS and GOSSD. Table 0.1 shows the recommended personnel ceilings and the number of vacancies for the three large utilities:

TABLE 0.1

RECOMMENDED PERSONNEL LEVELS

	1978 Budget and Recommended Level	Approximate Number of Personnel - December 31, 1978	Approximate Number of Vacancies - December 31, 1978
AWGA	3,746	3,450	300
GOGCWS	9,193	8,880	310
GOSSD	12,717	11,340	1,370

The vacancies should be used to hire only very critical skills, e.g., civil engineers, and electrical and mechanical technicians. Each of the three utilities should be able to meet its current service demands with considerably fewer personnel than they had on their payrolls on December 31, 1978. These ceilings should last five to ten years for AWGA and GOGCWS and until 1982 for GOSSD.

SCA is effectively restoring its facilities and expanding production with the most productive work force of the utilities. Nevertheless, the Master Plans call for staffing levels at Ismailia and Port Said approximately equal to current levels and at a slightly higher level in Suez. In addition, a central staff group with approximately 230 jobs must be set up to manage the proposed independent regional utility.

The governorate sewerage operations have low productivity levels. Much of the equipment is not functioning due to the 1973 war and poor maintenance. Nevertheless, there is a great amount of work to do refurbishing and expanding facilities. There are critical current needs for skilled craftsmen, technicians and engineers but not for higher total manpower levels. It is recommended that personnel levels be frozen at about the current level and that the utilities gradually adjust their staffing to the levels needed in 1985:

TABLE 0.2

SUEZ CANAL GOVERNORATE SEWERAGE STAFFING

	Current Personnel	1985 Personnel Required	Difference
Ismailia	218	207	-11
Port Said	452	346	-106
Suez	326	489	+163

If sewage collection rates increase at the high rates projected after 1980, the staffing ceilings should increase at about half of the rate of increase in sewage collected.

0.3.2 Personnel Systems

Improve personnel systems in several areas related to incentives and personnel training and development.

0.3.2.1 Interim recommendations. The following improvements, which can be made within current laws, should be implemented as soon as feasible:

- Develop and install a system for evaluating personnel performance and potential and for determining training and development needs. (See Paragraph 4.1.2.) This system includes:
  - Performance standards.
  - Critical incidents.
  - Personal development plans.
- Create a job qualifications statement for each job that is truly related to successful performance of the job. (See Paragraph 4.1.3.)
- Develop and implement a discipline policy and procedures to motivate employees and workers to proper behavior. (See Paragraph 4.1.4.)
- Develop and install productivity bonus plans in each utility (See Paragraph 4.1.5.):
  - Utility-wide plans
  - Work unit plans
- Develop and use human resources plans in each utility (See Paragraph 4.1.6.):
  - Departmental personnel management plans
  - Utility-wide manpower plans

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- Establish a Central Training Center exclusively for training water and sewerage personnel. (See Paragraph 6.1.1.)

- Set a very high priority on management and instructor training. (See Paragraphs 6.1.2 and 6.1.3.)

- Discontinue the existing apprenticeship programs and replace them with improved programs. (See Paragraph 6.1.4.)

- Establish comprehensive training programs to be given in the Central Training Center and/or in the utilities.(See Paragraph 6.2.) Training will be primarily for personnel in:

  . Management.

  . Maintenance.

  . Operations.

0.3.2.2 Long-term recommendations. The following important improvements cannot be made without modified legislation:

- Base promotions solely on each candidate's qualifications for the vacant position. (See Paragraph 4.2.1.)

- Establish job progressions for many non-supervisory jobs and promote candidates when qualified. (See Paragraph 4.2.2.)

- Provide proper incentives to encourage personnel to accept job assignments. (See Paragraph 4.2.3.)

- Revise the salary structure to eliminate inequities and provide incentives. (See Paragraph 4.2.4.)

0.3.3 Management Climate

Develop and implement a broad program to improve the management climate in each utility. (See Paragraph 4.1.1.) The program should include:

- Human resources management policy.

- Plans for each work unit.

- Training for managers and supervisors.

- Top management support.

0.3.4 Personnel Departments

Upgrade the Personnel Departments in each utility, including

- Personnel specialist skills.
- Responsibility of the departments.
- The departments' position in the organizations. (See Paragraph 4.1.7.)

These recommendations will go far towards helping the utilities solve their serious personnel problems and upgrading their workforces. Without a major upgrading of their personnel, the utilities will not be able to provide the improved water and sewerage services needed to meet Egypt's economic and social objectives.

Nevertheless, to solve the personnel problems existing in each organization, management must:

- Make these recommendations high priority items.
- Devote the needed resources and management time to their implementation and use.

ORGANIZATION MANUAL

1.0 INTRODUCTION

1.1 BACKGROUND

This Manual presents recommendations for organizational structure and staffing in the major water and sewerage utilities of Egypt. The work was performed under a Contract dated April 6, 1978 with the Ministry of Housing and Reconstruction. It fulfills Task 5.3.10 of the Scope of Work in Appendix 1 to the Contract.

This Manual is one of a series of reports, each of which recommends improvements in the management practices and tariff structures of the utilities. Two of these reports provide especially useful background to this Manual:

Management Systems: Organizational Environment and Structure

Management Systems: Personnel Systems

The first report considers the national structure and laws in which the organizations operate. Preliminary proposals were made for reorganizing the utilities. The second report proposes freezes on the number of personnel within each utility and training programs to develop the appropriate skills.

The organizations described in this Manual are those prescribed by the Advisory Committee in its response to the Organizational Environment and Structure Report. Other comments and decisions of the Advisory Committee and the Minister of Housing have been considered as well as the findings, conclusions and recommendations of the other Management Systems and Tariff Reports.

1.2 OBJECTIVES

The purpose of this Manual is to provide the following for each utility:

- Organizational charts showing lines of responsibility
- Recommended staffing level by type of skill
- Definition of the objectives and functions of each department
- Job descriptions for each category or type of key job

1.3 SCOPE

This Manual outlines the recommended organizational structures and staffing estimates for the water and sewerage utilities in the following cities:

- Alexandria
- Greater Cairo
- Ismailia
- Port Said
- Suez

The Manual also includes functional and job descriptions which were written for the utilities in the above cities but they may also be useful to other large water and sewerage organizations.

In addition, the Manual includes a brief presentation of the organizational structure and major departmental objectives and functions for two national, general organizations responsible for the planning, design and construction of water and sewerage facilities throughout Egypt, except Alexandria and Greater Cairo.

1.4 ORGANIZATIONAL STRUCTURES

1.4.1 Approach

During the past 16 months, the Management Study Team has reviewed intensively nearly all major functions of the utilities. The recommendations presented here are based on the knowlege gained from those investigations and upon the comments of utility personnel regarding earlier organizational proposals.

1.4.2 Considerations

1.4.2.1 Basic considerations. The organizational charts in this Manual are based upon an analysis of the:

- Major objectives of the organizations.
- Tasks to be performed to meet the objectives.
- Degree of specialization required to accomplish each task. (Tasks requiring a high degree of specialization usually require a separate department.)
- Degree of coordination required between tasks. (A high degree of coordination suggests that the two tasks should be related organizationally.)

Additionally a major effort was made to:

- Emphasize planning and policy-making rules.
- Clearly define responsibilities of managers.
- Identify and assign responsibility for functions that are not currently being performed.

1.4.2.2 Planning and policy-making. In each of the utilities the recommended number of vice chairmen is greater than the number today. Other reports in the Management Systems

Studies have shown the need for more planning and policy-making in all sectors of the utilities. The additional vice chairmen positions should provide more top management time for planning and policy-making. The job descriptions for these positions have been written to emphasize these roles.

1.4.2.3 Management services. Another step to increase the level of planning is the recommended establishment of a Management Services Department in each utility. The chairmen of such large organizations need a small group of people free from day-to-day operating problems that can help him analyze and research problems and prepare long-range plans.

1.4.2.4 Customer service. The key factor for long-term success of a utility is providing good service to customers. Establishment of a Customer Service Sector or Department is recommended for each utility. Such a Sector has several important advantages over the current structure:

- The customer can talk to one person (the Branch Manager) who has the authority to solve nearly all customer complaints and problems. Currently customers may have to deal with personnel from three sectors in three different offices merely to get a new connection.

- Responsibility for ensuring timely and accurate meter reading and for collecting revenues is centered in one person. He can therefore be held responsible for collecting all revenues due to the utility in his area. (There is substantial evidence that large amounts of revenues are not being collected either because meters are not working or are not being read. No one seems to be held responsible for these deficiencies.)

- Responsibility for development of comprehensive, integrated customer service policies can be clearly assigned.

- Potentially the Customer Service Sector can become a strong advocate for more attention and resources being directed to water quality, water pressure and response to complaints.

- The position of Branch Manager should offer excellent training for top management responsibilities since he must deal with the public and manage both technical and administrative functions and personnel.

1.4.2.5 Implementation. The organization structures outlined in this Manual are long-term in nature. Immediate implementation of the new structures may be delayed by:

- Lack of appropriate personnel to staff the positions.

- Job grades of existing personnel.

- Lack of space.

- Entrenched attitudes such as the artificial distinctions between administrative and technical personnel.

- Reluctance of managers to give up some of their present responsibilities and personnel.

Therefore variations of these structures may be appropriate in the near-term. Nevertheless, several steps should be taken as soon as possible:

- Establishment of additional vice chairmen positions.

- Establishment of a Customer Service function

- Establishment of a Project Management structure within the Technical Sectors.

1.4.3 Titles of Managers

Recommendations are provided for the title of the manager of each department listed in the organizational structures. In general, the titles of managers correspond to organizational level. The following grades and levels are used:

Title	Grade	Organizational Level
Chairman	Executive	Utility
Vice Chairman	Executive	Sector
General Manager	Executive	General Department
Manager	1	Department
General Supervisor	2	Group
Supervisor	3	Unit

Executive level titles were assigned to department heads who have significant responsibility for policy-making and who manage several diverse functions. Department heads who have significant decision making responsibility but who manage a homogenous function were usually designated as Managers. Department heads who operate under well-defined rules and procedures were given titles of General Supervisor or Supervisor.

The number of people managed was a secondary consideration in assigning titles. The General Manager, Personnel, for example, must make similar kinds of decisions regardless of the size of the utility.

1.5 OBJECTIVES AND RESPONSIBILITIES

The objectives and responsibilities of the water and sewerage utilities are similar. Therefore they are presented in the following paragraphs rather than being repeated in each section. Objectives for the National Water and Sewerage Authorities are presented in their respective sections (Sections 7.0 and 8.0).

1.5.1 Water Utility Objectives

The major objectives of each water utility should include:

- Providing piped water (to the extent resources are available) to all people living within the service area either through house connections or by public fountains within a reasonable distance from each home.
- Ensuring that the water delivered to each customer's premises meets the legal quality standards.
- Ensuring that adequate levels of pressure are constantly maintained throughout the system.
- Protecting water sources from pollution or contamination..
- Encouraging conservation of water by customers.
- Ensuring that sufficient revenues are obtained to cover costs of operation, maintenance, routine and improvements and debt service.
- Responding quickly and effectively (but not necessarily affirmatively) to customer complaints, requests and suggestions.
- Applying the optimum (i.e. minimum) level of financial and human resources required to achieve the above objectives.

1.5.2 Sewerage Utility Objectives

The major objectives of each sewerage utility should include:

- Providing sewage collection service (to the extent resources are available) to all persons living within the service area.
- Ensuring that disposal of the sewage collected does not endanger public health.
- Ensuring that sufficient revenues are obtained to cover costs of operation, maintenance, routine improvements and debt service.
- Responding quickly and effectively (but not necessarily affirmatively) to customer complaints, requests and suggestions.
- Applying the optimum (i.e., minimum) level of financial and human resources required to achieve the above objectives.

1.5.3 Organization Responsibilities

The responsibilities of each utility shall include:

- Establishing policies, rules, and procedures for:
  - Extending service to new customers.
  - Identifying and collecting all revenues due to the Utility.
  - Accounting for the use of resources.
  - Establishing financial reserves.
  - Maintaining appropriate levels of service to customers.
  - Maintaining facilities and equipment.
  - Use of the Utility's facilities by customers.

(See Section 9.3 of the Water Utility Tariffs Final Report and Section 9.2 of the Sewerage Utility Tariffs Report for additional policy recommendations.)

- Effectively and efficiently operating and maintaining the facilities of the Utility.
- Determining the number, skills, and organization of personnel required to operate the Utility.
- Acquiring, compensating and disciplining employees within the limits set by the labor laws governing general organizations.
- Determining the rules and criteria for promoting managerial personnel.
- Proposing tariffs.
- Proposing long-term financial, manpower and construction plans.
- Proposing annual capital and operating budgets.
- Executing the plans approved in the annual budgets.
- Proposing tariffs that will adequately finance the Utility.
- Contracting loans.
- Selecting, within approved budgetary limits, suppliers and contractors to serve the Utility.
- Conducting research and studies to improve the level of service provided.
- Cooperating with housing and other government agencies in providing water for new facilities.
- Publication of an annual report and final accounts.

1.6 FUNCTIONAL DESCRIPTIONS

Most of the functions to be performed are similar in all of the utilities. Therefore a common set of functional descriptions was written and is given in Appendix 1.(1) Where important differences exist among the utilities for the same

Note: (1) Not included with this Management Systems - Overview.

function (e.g., the functions of a water and sewage treatment plant are different), separate descriptions have been written. The appropriate functional description is referenced in the organizational structure provided for each utility.

These descriptions are based upon personal observation, existing written descriptions provided by the utilities and descriptions obtained from U.S. utilities.

1.7 JOB DESCRIPTIONS

Job descriptions were developed and are presented in the same way as the functional descriptions. The descriptions are given in Appendix 2.(1) Jobs for which no descriptions are given are either well-defined (e.g., security) or depend on the talents of the man and the desires of his superior (e.g., Internal Consulting).

Managerial and technical responsibilities, relationships, qualifications and measures of performance are specified for each position. Authority was not defined because it should change with time. When a person is newly promoted, his superior may wish to limit his authority. As he develops on the job, the scope of his authority should be broadened. For this reason, scope of authority is seldom mentioned in job descriptions. (For further discussion see Section 3.2.1 of the Special Report on Management Procedures - AWGA and Section 2.2.5 of the Personnel Systems Report.)

Note: (1) Not included with this Management Systems - Overview.

1.8 STAFFING LEVELS

Estimates of the staffing levels required in 1980 have been made for each utility. These estimates are given by sector and then by skill level.

1.8.1 Approach

The year 1980 was chosen as the point of estimation for three reasons:

- A realistic comparison can be made with the present work force and existing equipment.
- The effects of the Master Plan programs on staffing are difficult to predict. New treatment plants and new distribution lines will require additional people. On the other hand, repair and renovation of existing facilities will often significantly reduce the need for maintenance personnel.
- The enormous size of the proposed programs (expenditures of LE 311 million in 1980) suggests that many of the programs will be delayed or abandoned.

This Manual presents estimates of the minimum number of people required to operate the existing or about-to-be completed facilities. These levels do not depend on the introduction of sophisticated new equipment nor do they require that everyone is an expert in his job. They do require that management plan the work carefully and excercise discipline over the work force.

In all cases except Suez Canal Water Operations, far fewer people are required than are actually present today. Noting the legal restraints on dismissing personnel, the Personnel Systems Report recommends freezes on personnel. These freezes generally equal the 1978 budgeted personnel levels. The data in this Manual suggest that these freezes are practical and should hold for at least five years.

1.8.2 Methodology

The staffing levels presented are based upon personal visits to utilities, review of personnel guidelines for U.S. utilities, the reports of the Master Plan consultants and a detailed analysis of volume of work and pieces of equipment for each utility.

For many jobs, the estimated number of man-hours to accomplish a given task should be nearly the same in all utilities. Exhibit 1.1(1) lists some of these jobs and the estimation standards that were used. Occasionally local conditions will require some variation in these standards.

Numerous volume statistics were obtained from the utilities. In addition the following volume statistics were obtained from the Water Utility and Sewerage Utility Tariff Reports:

- Proposed 1980 capital improvement expenditures
- Estimated operation and maintenance expense in 1980
- Number of subscriptions
- Net plant in service

Note: (1) Not included with this Management Systems - Overview.

Additional analyses of capital improvement expenditure were based on the reports of the Master Plan consultants. Counts of mechanical, electrical, and civil equipment and structures were obtained from the Water Utility and Sewerage Utility Inventory and Valuation Reports by BVI-ATK Associates.

For all except shift work, hours of work were assumed to be five effective hours per day, 240 days per year. Four shifts were assumed to be required for continuous operations.

The utilities presently contract out large capital improvement projects, nearly all excavation work (e.g., excavation for customer connections) and some other jobs that require hard labor (e.g., cleaning of clarifiers). These estimates assume those practices will continue.

1.8.3 Definitions

Many of the skill classifications used in the staffing analyses are self-explanatory. The others are described in the following paragraphs:

- Commercial Specialists. This classification includes lawyers, accountants, purchasing agents, personnel specialists, storekeepers, and others who have advanced knowledge of financial and administrative concepts and techniques. Most of these people should have university degrees but some may qualify on the basis of judgement, managerial ability and experience.

- Treatment Specialists. This group includes plant managers, shift foremen, chemists and others who must understand the theory and practice of water or sewage treatment. Chemists, sanitary engineers and chemical engineers are the most likely candidates with good experience, managerial ability and judgement may qualify.

- Mechanical/Electrical Specialists. These people are capable of diagnosing problems and in making repair or replacement decisions concerning mechanical and electrical equipment. They may be mechanical or electrical engineers or workers who have developed good judgement through experience. Those in the Technical Sector will be knowledgeable of design and construction criteria and techniques.

- Civil Engineering Specialists. These personnel are familiar with the design, construction and maintenance of structures. Technical Sector personnel will primarily be trained engineers. In the operating departments, most foremen and many manager positions can be filled by workers who have developed sufficient technical knowledge and good judgement through experience.

- Secretaries. These are skilled clerks who can relieve a manager of many routine administrative matters.

- Clerks. These people must be able to perform routine office procedures. Many of them must also be able to type.

- Machine Operators. These personnel operate billing machines, computers and other data processing equipment.

- Mechanics. These personnel are capable of disassembling and reassembling mechanical equipment under the guidance of a foreman. Except for minor jobs such as bending a metal strap, they are not fabricators of parts.

- Machinists. These personnel are capable of fabricating metal parts from construction drawings or from measurements of old parts. They are highly competent in using lathes, drill presses, grinders and other machine shop equipment.

- Master Builders. These personnel can perform minor carpentry, cement work and other structural repairs.

- Operators. These personnel are knowledgeable in the operation of equipment assigned to them. They perform minor, every-day maintenance tasks (e.g., oiling), record operating data, and keep the area assigned to them clean and in safe operating condition.

- Repairmen. These personnel are responsible for installation and repair of distribution or collection lines. They include personnel who repair pipes, make connections, construct small extensions, and install hydrants and valves on existing pipes.

- Construction Foremen. These are experienced workers capable of monitoring the work of contractors. They must be familiar with common construction techniques and precautions. They work under the supervision of a Project Manager who is responsible for ensuring that the contractor properly performs the work.

ORGANIZATION CHART -
GENERAL ORGANIZATION FOR GREATER CAIRO WATER SUPPLY

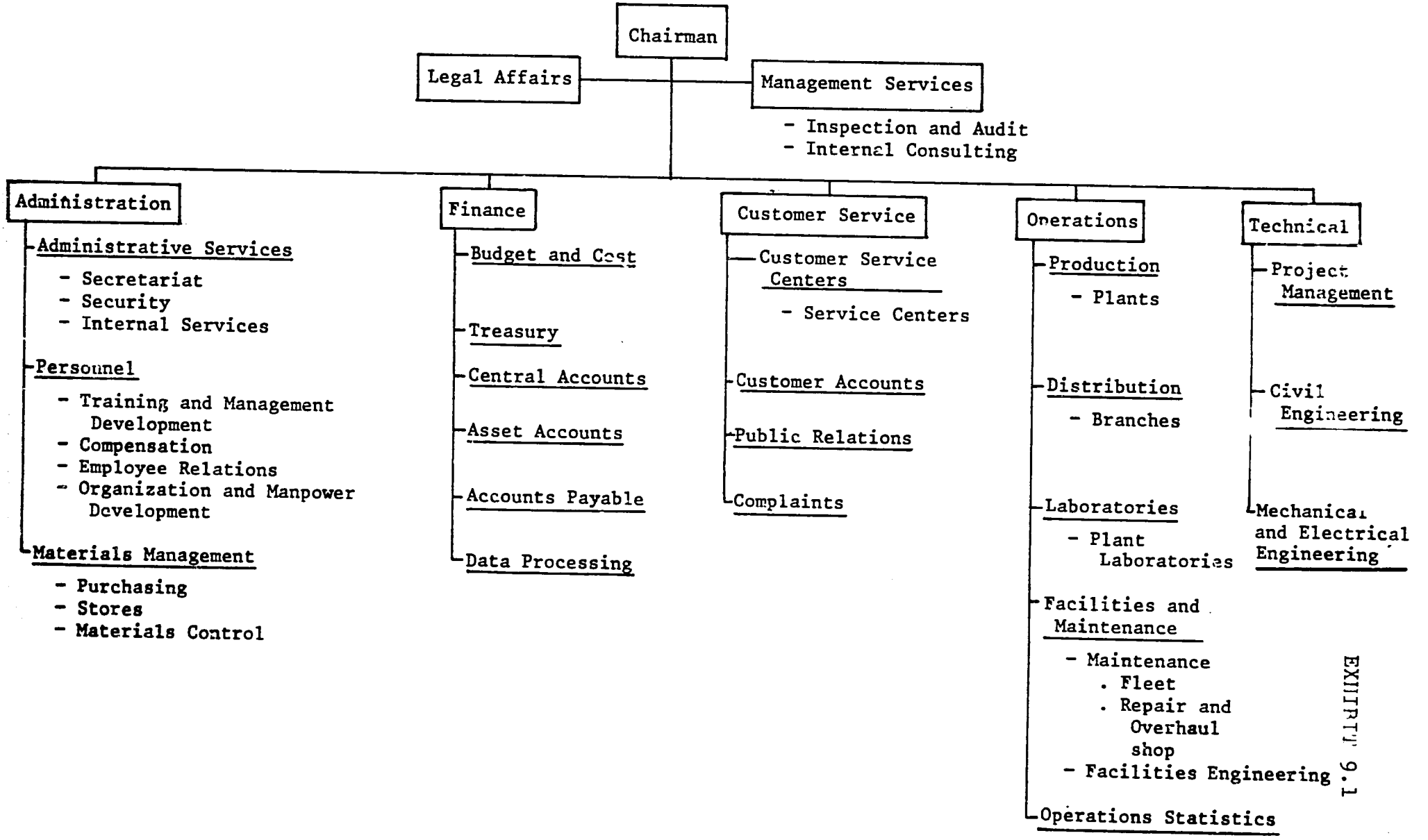


EXHIBIT 9.1

ORGANIZATION CHART -
GENERAL ORGANIZATION FOR GREATER CAIRO SEWERAGE AND SANITARY DRAINAGE

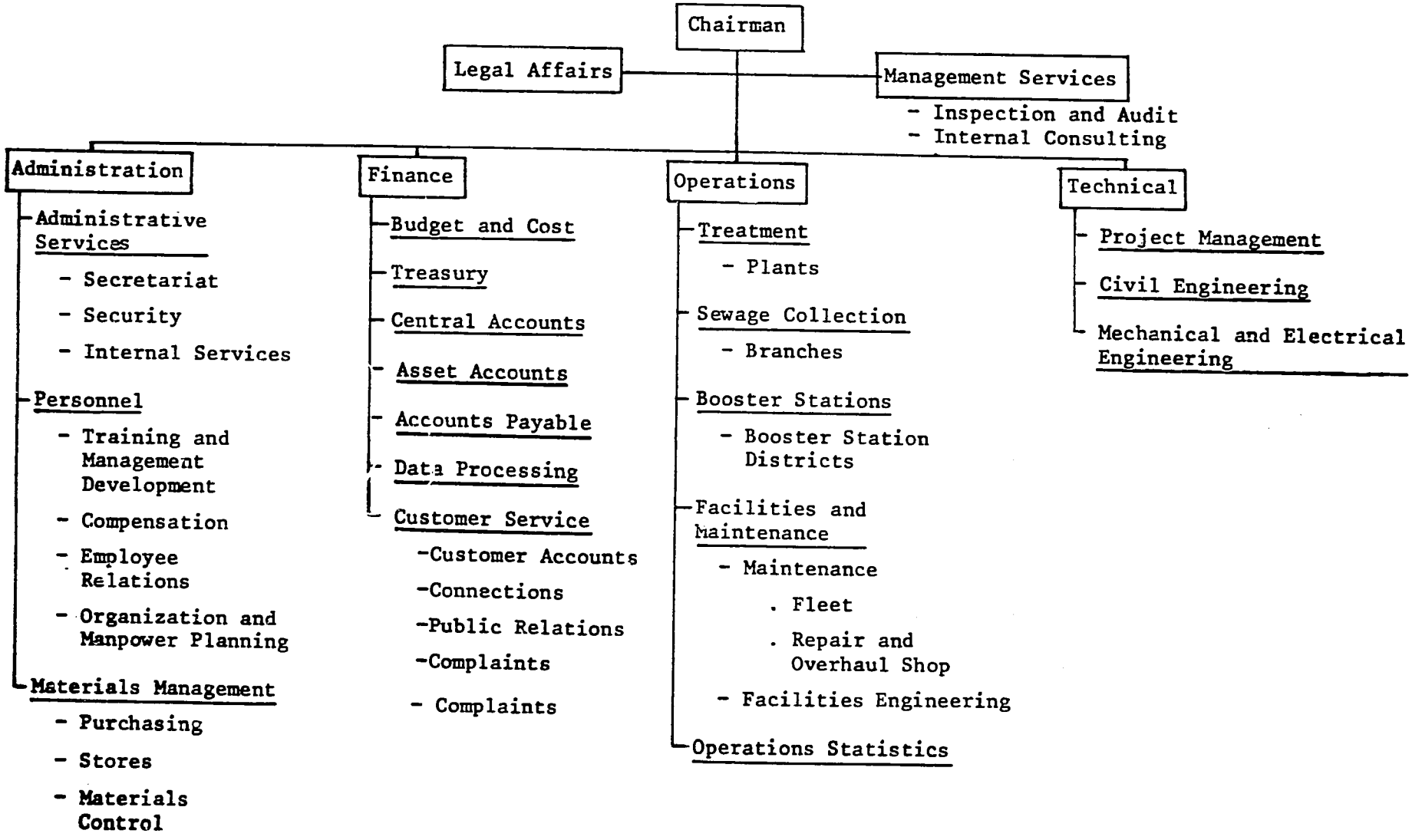


EXHIBIT 9.2.

ORGANIZATION CHART -
ALEXANDRIA WATER GENERAL AUTHORITY

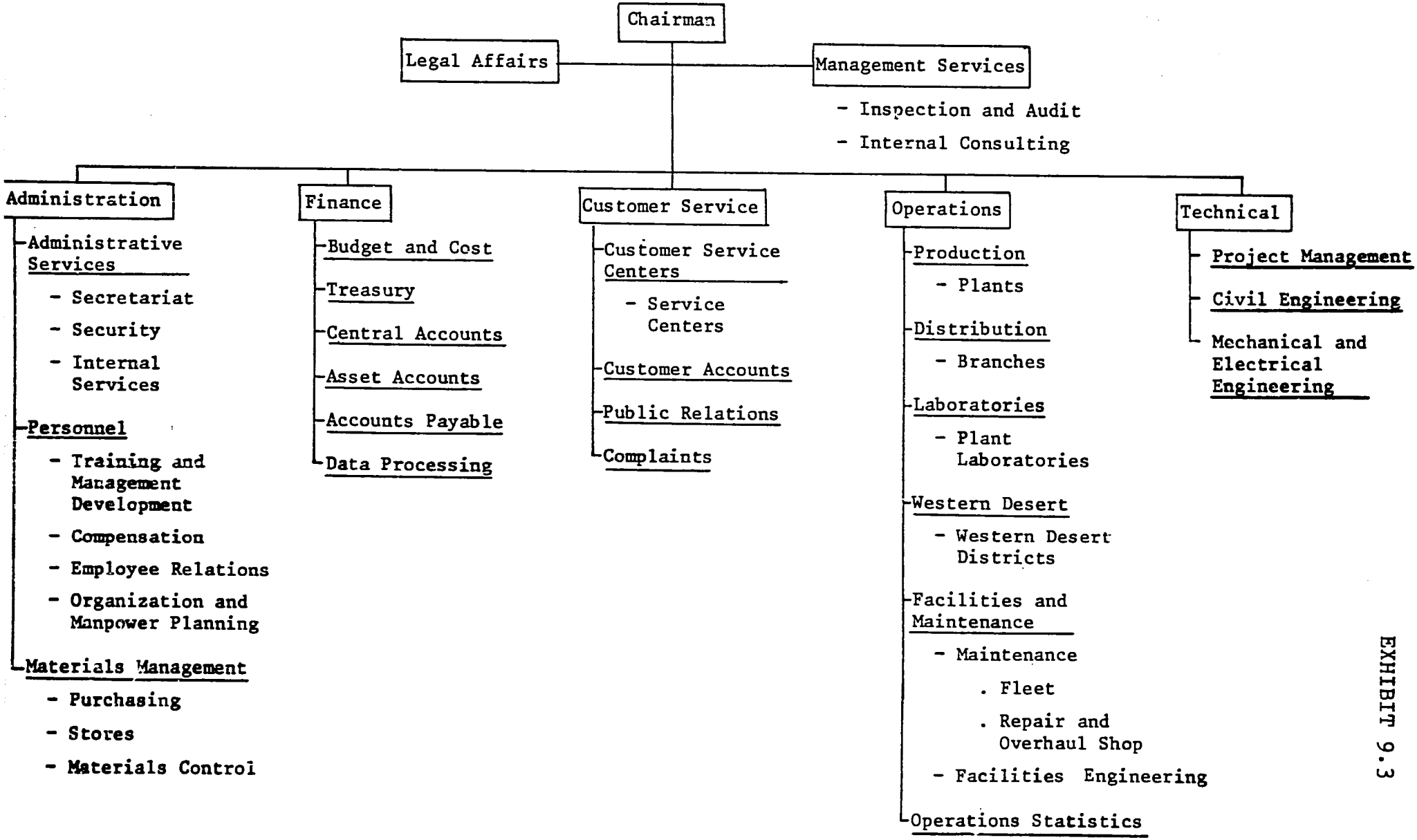


EXHIBIT 9.3

ORGANIZATION CHART -
GENERAL ORGANIZATION FOR ALEXANDRIA SEWERAGE AND SANITARY DRAINAGE

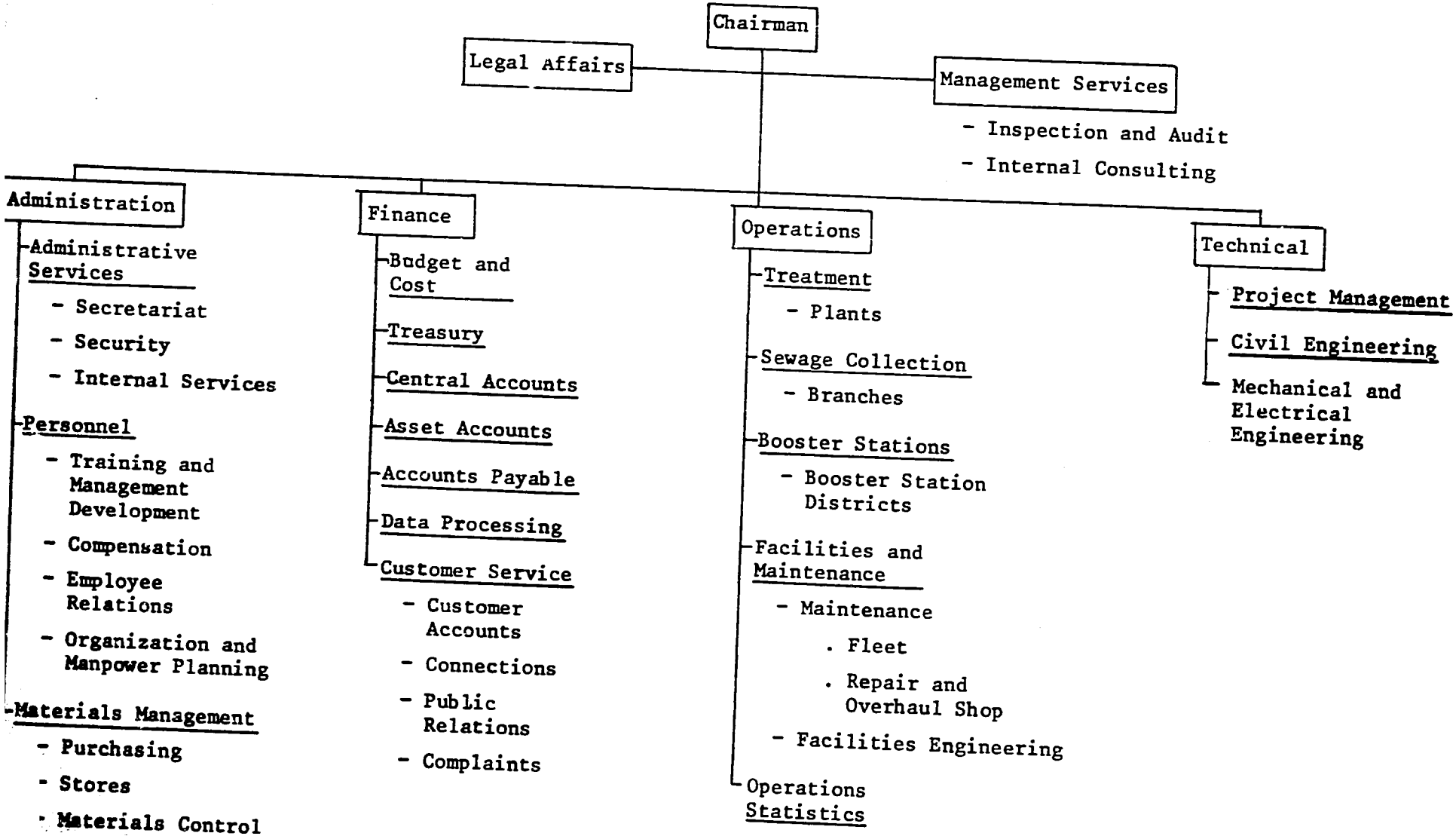


EXHIBIT 9.4

STAGE ONE ORGANIZATION CHART -
GENERAL ORGANIZATION FOR
SUEZ CANAL REGION WATER SUPPLY

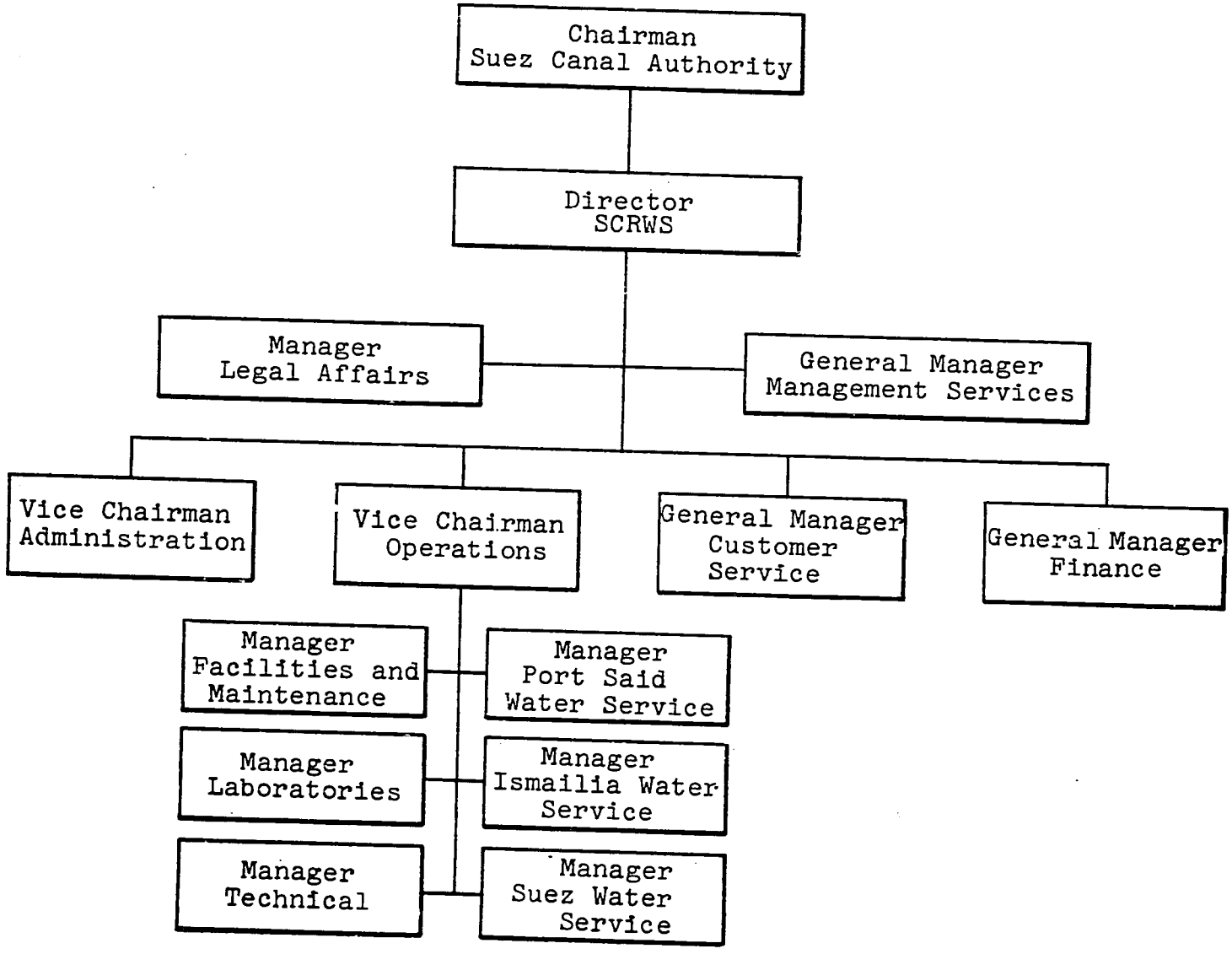


EXHIBIT 9.5

STAGE TWO ORGANIZATION CHART -
GENERAL ORGANIZATION FOR
SUEZ CANAL REGION WATER SUPPLY

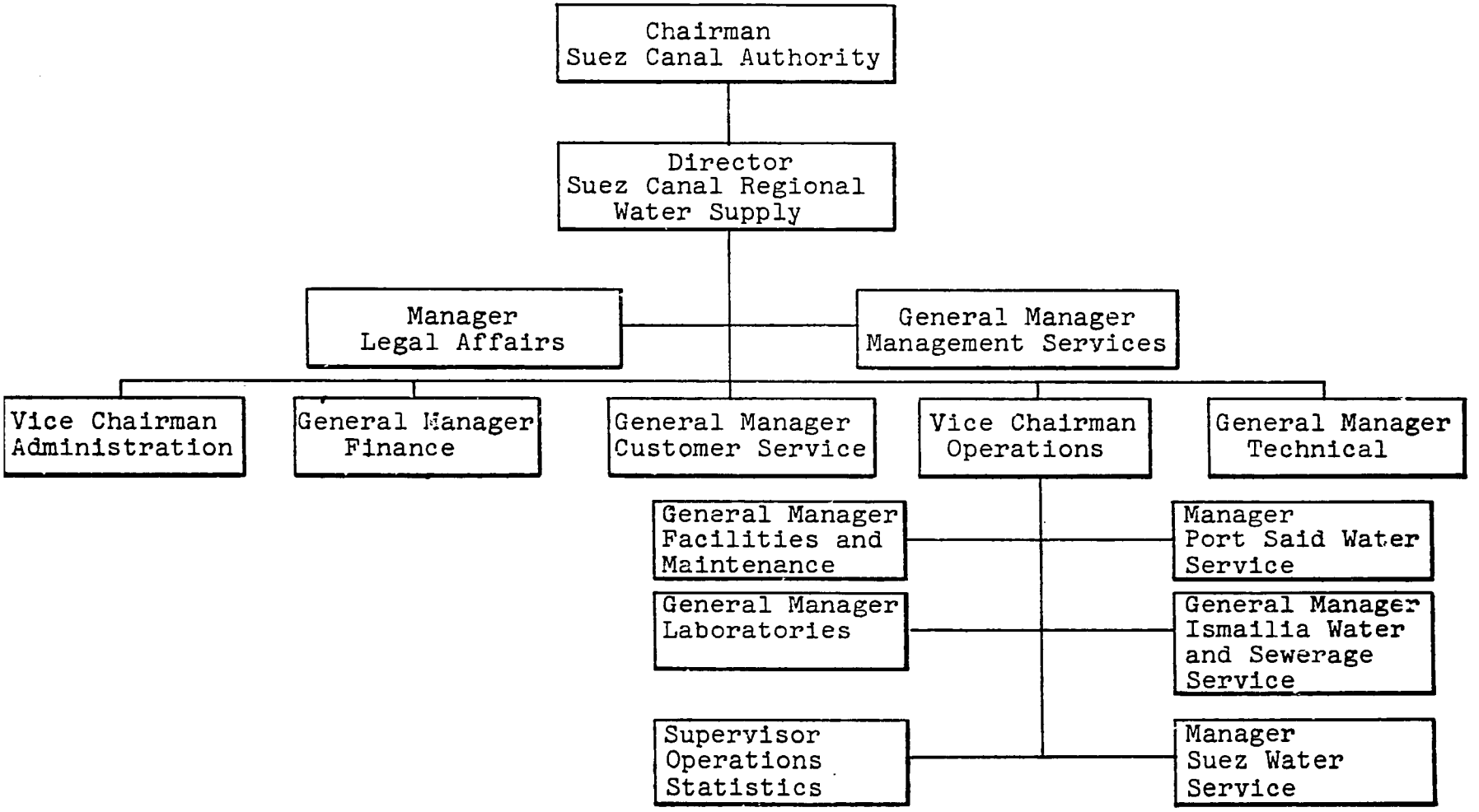
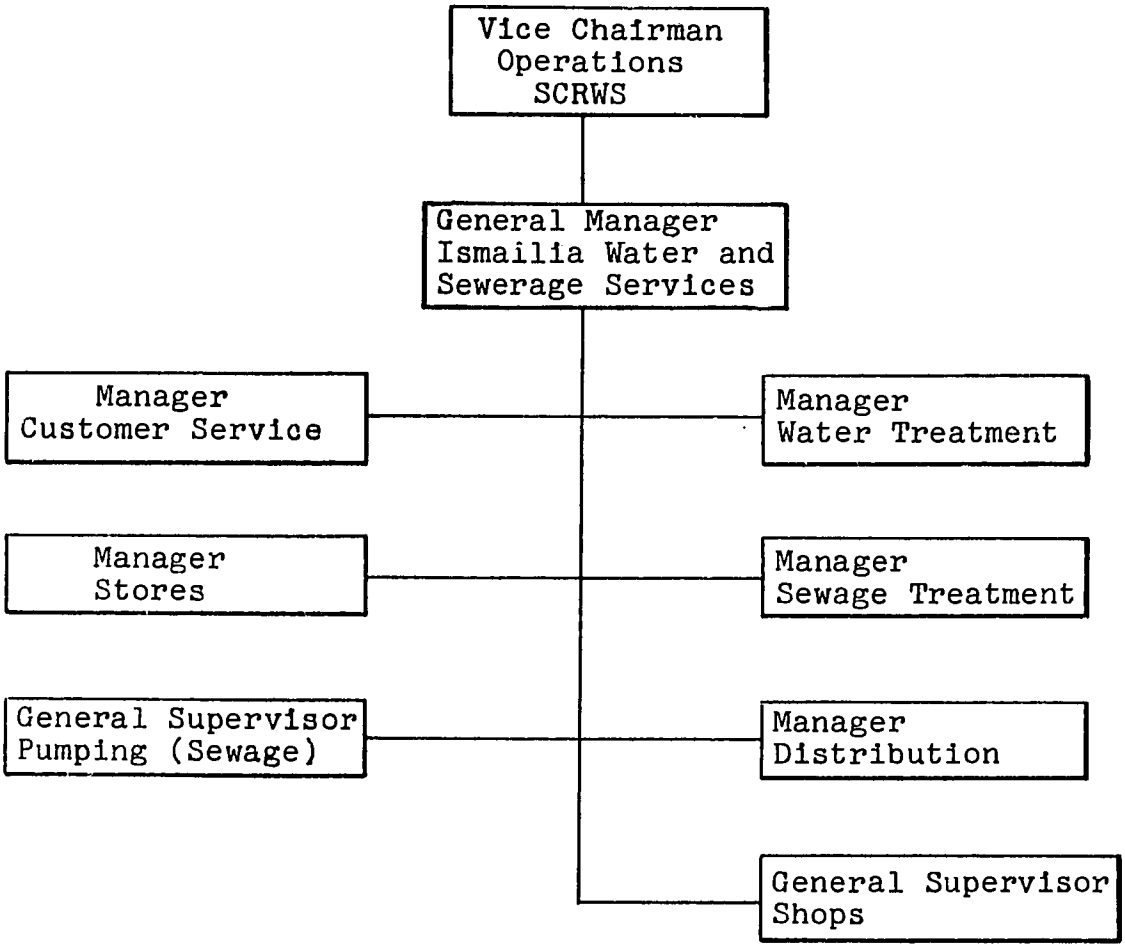


EXHIBIT 9.6

EXHIBIT 9.7

ORGANIZATION CHART -
ISMAILIA WATER AND SEWERAGE
SERVICES DEPARTMENT



ORGANIZATION CHART -

GENERAL ORGANIZATION FOR SUEZ CANAL REGION WATER AND SEWERAGE SERVICE

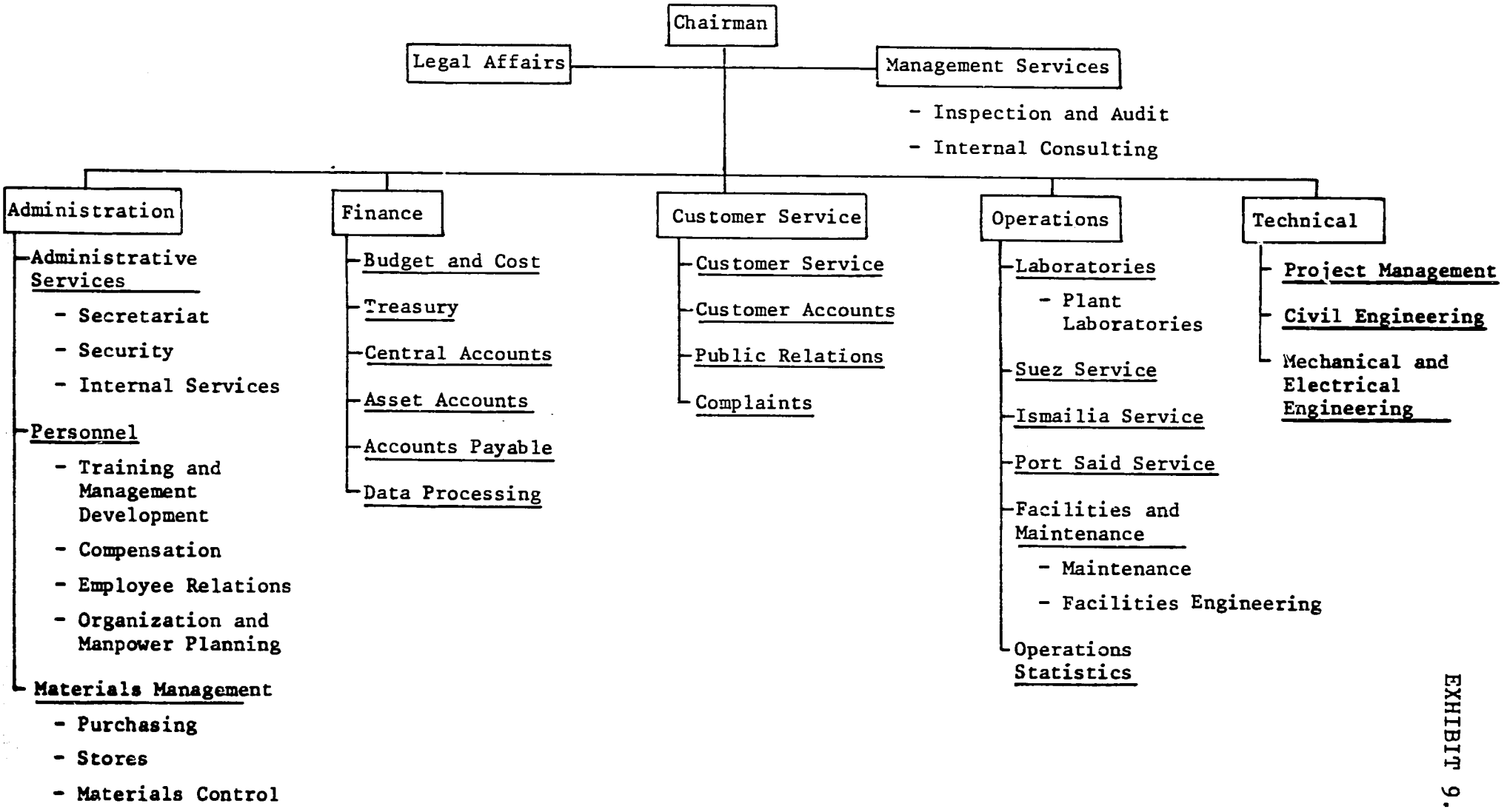


EXHIBIT 9.8

ORGANIZATION CHART -
NATIONAL WATER AUTHORITY

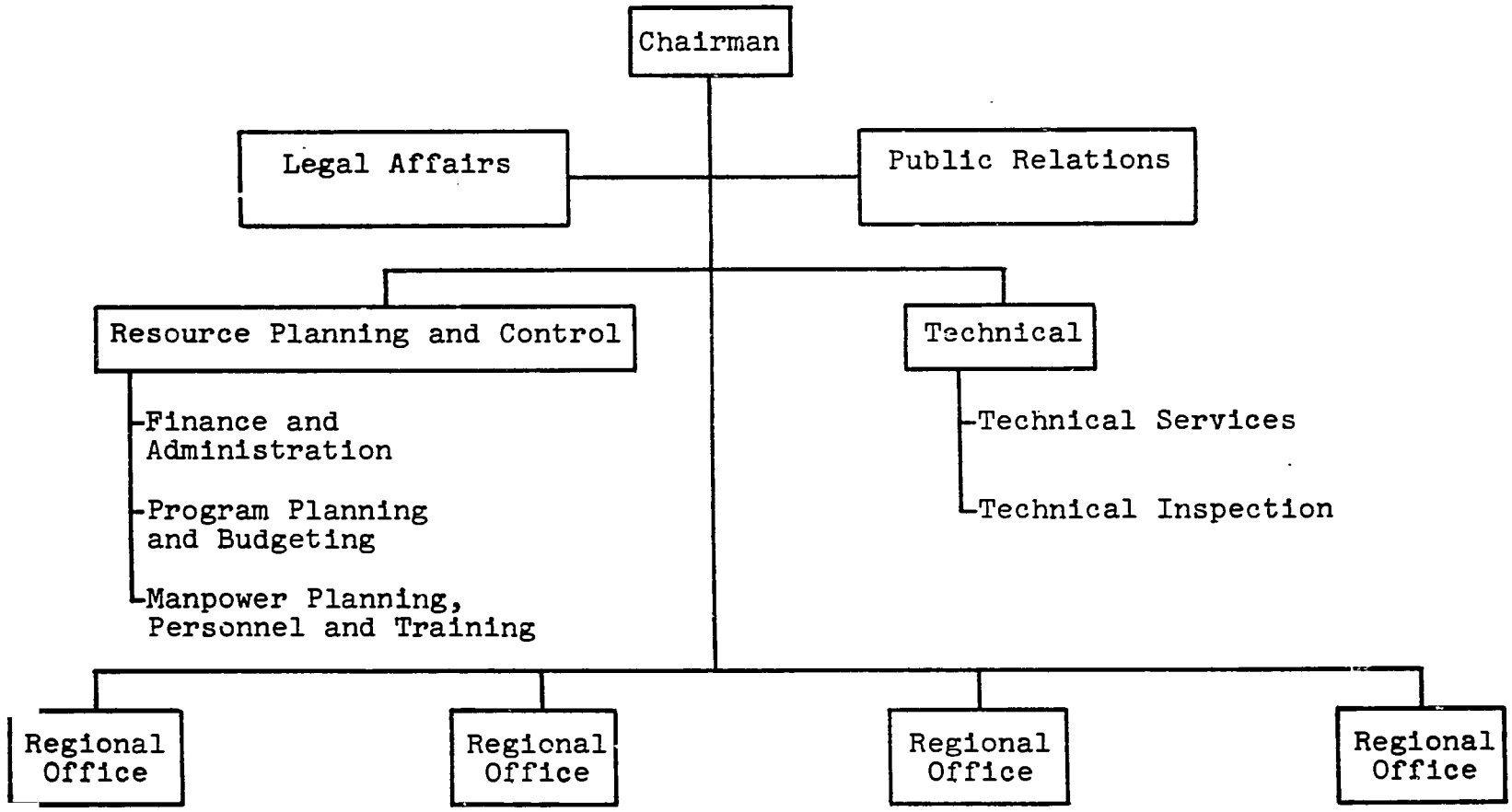
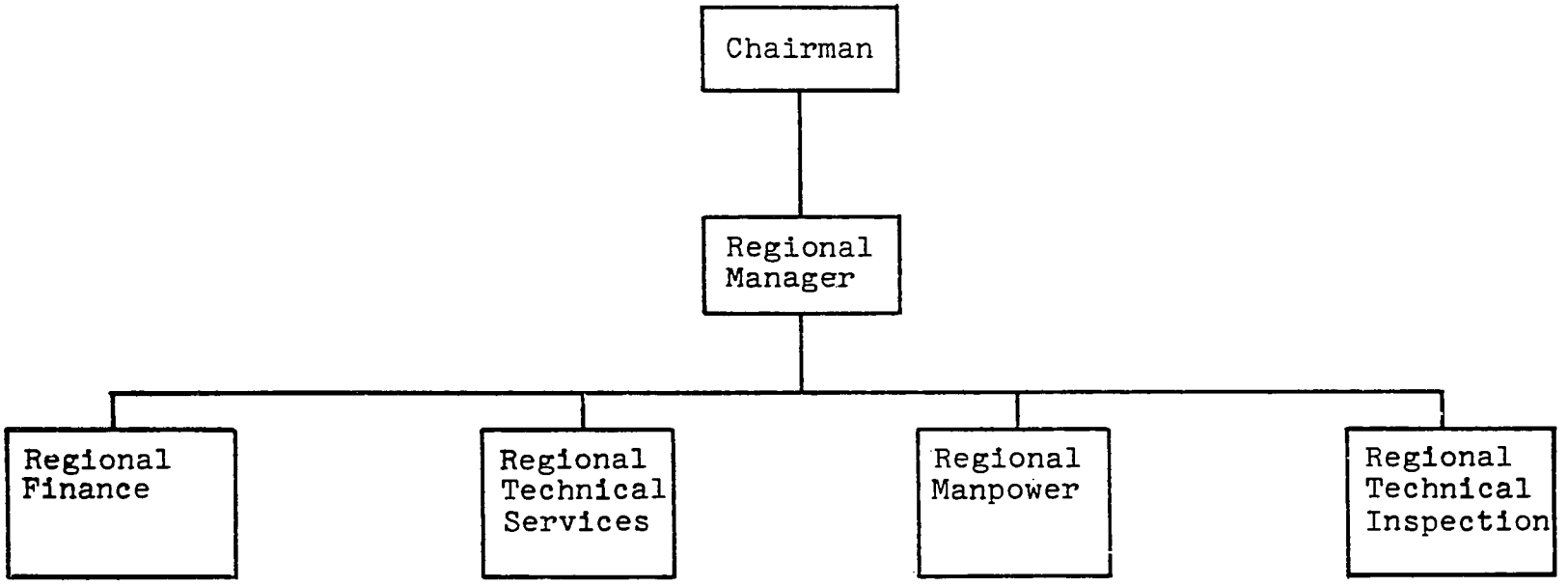
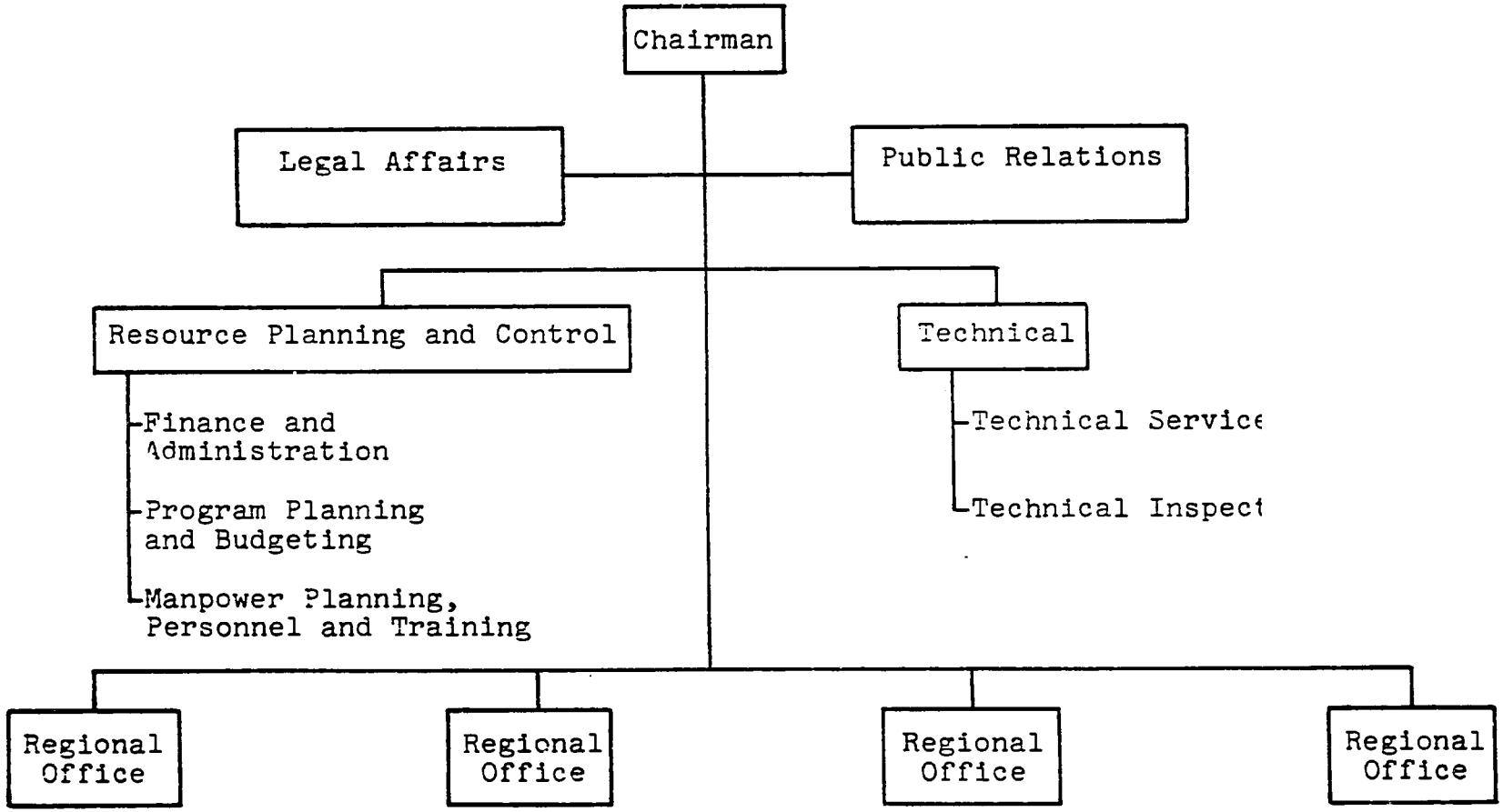


EXHIBIT 9.9
Page 1 of 2

ORGANIZATION CHART -
NATIONAL WATER AUTHORITY



ORGANIZATION CHART -
NATIONAL SEWERAGE AUTHORITY



ORGANIZATION CHART
NATIONAL SEWERAGE AUTHORITY