

A.I.D. EVALUATION SUMMARY: PART I

PD-AAZ-01A  
 17/03/91

A. REPORTING A.I.D. UNIT: USAID/EGYPT  
 ES#:88-9

B. WAS EVALUATION SCHEDULED CURRENT FY EVALUATION PLAN?  
 Yes\_\_ Slipped\_\_  
 Ad hoc\_\_

C. EVALUATION TIMING:  
 Interim\_\_ Final\_\_  
 Ex Post\_\_ Other X\_\_

D. ACTIVITY EVALUATED: CAIRO SEWER I O & M TRAINING (263-0091)

E. ACTION DECISIONS APPROVED BY THE MISSION DIRECTOR: OFFICER COMPLETION DATE

1. Strengthen Institution:

- o Support policy dialogue with appropriate GOE officials in order to strengthen GOSD. P.Thorn Ongoing through CS II
- o Collaborate with appropriate GOE officials on issues of timing of FX allocations for spare parts, personnel ceilings, early retirement and incentive awards. T.A. Contractor Mike Gould Ongoing through CS II
- o Use Work Order 4A assessments to assist GOSD in defining O&M needs and preparing annual O&M budget submissions. T.A. Contractor Mike Gould 2/1990
- o Undertake feasibility study of privatizing sewer cleaning and pump station maintenance functions. T.A. Contractor Mike Gould 2/1990

2. Monitor O&M Performance:

- o Continue to oversee GOSD's technical evaluation department's reinstatement of performance monitoring with regular reporting to upper management, participants and USAID. Mike Gould Ongoing through CS II

3. Expand Training:

- o Increase USAID funding for implementation of O&M training recommendations and creation of training facilities. Mike Gould Ongoing through CS II
- o Investigate USAID funding mechanisms for establishing graduate management program at AUC for public utility engineers. Mike Gould Ongoing through CS II

F. CLEARANCE/APPROVAL OF EVALUATION SUMMARY AND ACTION DECISIONS:

Technical Directorate      Program Development and Support Directorate      Deputy Director  
 C. Weden

S.Patton, DR/UAD *SP*  
 M.Gould, DR/UAD *MG*  
 H.Hasan, OD/UAD *HH*  
 P.Thorn, AD/UAD *PT*

L.Erikson, PDS/P *LE*  
 D.Leaty, OD/PDS/P (A) *DL*  
 V.Molldrem, AD/PDS/P (A) *VM*

Approved: *Marshall D. Brown*  
 Marshall D. Brown, DIR

*7/2/91*  
 Date

## G. EVALUATION ABSTRACT

The training component of the Cairo Sewerage I project aims to make the staff of the Cairo General Organization for Sanitary Drainage (GOSD) more effective in operating and maintaining the Cairo sewerage system. This impact evaluation (11-88) was conducted by the Water and Sanitation for Health Project (WASH) on the basis of site visits, interviews, and a review of previous evaluations and project documents in order to determine if O&M training and performance monitoring had improved operation and maintenance of the sewerage system.

### Major Findings and Conclusions:

1. O&M training contributed to improved performance of pump stations and sewer cleaning which, along with several other factors, contributed to a 2/3's reduction in sewerage flooding.
2. Though inadequate numbers of staff (6-7%) were trained, the training was effective because it accounted for educational backgrounds of attendees and was presented in Arabic by esteemed Egyptian staff.
3. A key element in improved station performance was the recognition by GOSD O&M staff that their work was regularly observed and evaluated via performance monitoring checklists.
4. In the 18 month hiatus between the conclusion of the activity and implementation of Work Order 4A, performance monitoring and good O&M practices lapsed in all but one case due to lack of institutional support.
5. Institutionalization of O&M training is hampered by GOSD's lack of management and budgetary autonomy, by uncertain supply of FX for purchase of spare parts, by GOSD's inadequate but underspent O&M budget, by excess numbers of poorly paid workers and by lack of incentives for good performance.
6. If applied on a consistent basis with adequate budgetary and other institutional support, this O&M training program could serve as a model for other GOE and USAID activities.

### Key Recommendations:

1. The scope of O&M training should be expanded to include management training for engineers, donor training funds should be expanded, more attention should be given to training needs of illiterates, a cadre of indigenous Egyptian trainers should be developed, on-site O&M training should be offered, donor funded training facilities should be created.
2. USAID should oversee GOSD's technical evaluation department's reinstatement of the sewer cleaning performance monitoring and evaluation scheme and should require them to produce regular reports for the head of O&M and participating areas.
3. Institutional support for good O&M should be enhanced by having W.O. 4 a staff assist with preparation of GOSD's budget bid to the Ministry of Finance, having GOSD spend entire O&M budget allocation, by determining FX allocation for spare parts early in the year, by reducing redundant personnel, by securing top management support for O&M, by having GOSD work towards autonomy, possibly as a public company raising its own revenues or by having USAID work directly with GOSD on O&M matters.
4. A pilot study of the feasibility of privatizing sewer cleaning and pump station maintenance should be undertaken.

---

## H. Evaluation Costs \$70,000

1. Evaluation Team	Contract #	OR	Contract	Cost	OR	Source of	
Bill Nelson (Team	TDY	Person	Days	TDY	Cost	(US \$)	Funds
Planning Facilitator (WASH)						263-0102	\$70,000
Tony Young (Team Leader) (WASH)							
A. Tarik Bnafa (WASH)							
Wefky Mansour (WASH)							
Iman Ghazalla (IQI)							
Youssef El Rafei (WASH)							

## A.I.D. EVALUATION SUMMARY: PART II

### I. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

#### Project Description:

The Cairo Sewerage I Project was designed to rehabilitate and expand the Cairo sewerage system. This evaluation is only concerned with the training component of the project.

All design and construction related project activities were handled by the Cairo Wastewater Organization (CWO), within the Ministry of Reconstruction, New Communities, Housing and Public Utilities. The Cairo General Organization for Sanitary Drainage (C/GOSD) is responsible for the staffing, operation and maintenance of the Cairo wastewater system. GOSD is the project recipient of all training, operations and maintenance, and management assistance activities.

#### Evaluation Purpose and Methodology:

The purpose of this evaluation is to determine if the O&M training itself was successful and if the training has been effective in improving actual operation and maintenance of the sewerage system. The evaluation should also aid GOSD in assessing institutional changes which need to be made to better utilize future funding.

Evaluation data sources include the 2-88 EQI evaluation, performance evaluation checklists and contracts, site visits, and interviews with senior and middle management staff, a sample of trainees of GOSD and CWO, and the contractor staff of AMERIC and USAID.

#### Background

1. Work Order 4A (WO 4A) was written to facilitate training activities under the follow-on project, Cairo Sewerage II.
2. The "performance monitoring checklist" was developed to evaluate the impact of the O&M training program. The checklist includes:
  - condition of pump control panels and automatic controls, and auxiliary equipment
  - condition of wet wells
  - consistent documentation of performance monitoring forms
  - housekeeping and site safety

#### Findings and Conclusions

##### A. Performance Monitoring and Training

1. The training itself was successful as measured by the performance monitoring checklists.
2. Major elements of the training's success include:
  - Arabic language
  - simplicity

- hands-on, practical application of training
  - presentation of material by esteemed Egyptian staff
  - emphasis on role of trainee within the greater organization and water cycle, and his consequent importance to society as a whole.
3. Less direct reasons for GOSD staff's improved performance are:
    - cognizance of consistent observation of performance
    - recognition of work well done
    - introduction of competition among the seven areas being evaluated
  4. Only about 600 staff (6-7% of workforce) have been trained.
  5. Management training urgently needed.
  6. Sustainability depends on training being an ongoing process. Needs for the future include:
    - more training for illiterate employees
    - adequate spare parts at work site
    - safety training and equipment
    - indigenous trainers and Arabic-speaking consultants
    - a fully-equipped training center as well as on-site training
  7. The training program under CSII should be overseen by AID as long as possible.
  8. GOSD is anxious to expand training and equip a training center, but has received no funds for training since 1986 except through WO 4A .
  9. Training came to a complete halt due to the 15-month hiatus between the end of the training activity and the beginning of Work Order 4A.

B. Impact of Training on Actual Operation & Maintenance

1. Training had a significant positive effect on overall performance of the wastewater/sewerage system as evidenced by:
  - GOSD officials' assertions that trained personnel enhanced the efficiency of pumping operations
  - marked decrease in sewerage flooding. This is also indicative that the performance monitoring system is a reliable measure of performance.
  - improved performance of pump stations and sewer cleaning.
2. Success of this project depended on other factors as well as training such as:
  - capital works; the rehabilitation of pump stations
  - provision of equipment e.g. mechanical sewer cleaning equipment
  - practical advice on and systems implementation of sewer cleaning
  - checklists on preventive maintenance.
3. There is disagreement among GOSD management as to the magnitude of the impact of training, though all agree that training at all levels is desirable. The uncertainty can be attributed to the limited scope of the training program under CSI.

C. Institutional Support for and Constraints to Improved Operations and Maintenance at GOSD

1. Institutional problems include poor pay, the organizational structure itself, and GOSD's lack of autonomy within the larger government structure.

## 2. Specific problems include:

- nonexistence of a policy for training
- existing training center at Syphon totally inadequate
- low priority given to training vs. construction, design, and O&M
- no rewards of any kind related to successful training.

## Principal Recommendations

1. Significantly increase the number of trainees.
2. Train the technical evaluation department in the use of the performance monitoring scheme and make it responsible for its operation, including reports to management and labor.
3. Annual competition with prestige, prizes, and publicity.
4. Staff newspaper.
5. A graduate program in management should be developed with the American University in Cairo (AUC) for GOSD and other public utility companies. Employees should attend part-time and work for the company full-time while attaining their masters degrees.
6. Long-term training policy should be established, adequate budget should be allocated to GOSD, and an enthusiastic, energetic training department should be developed.
7. Training facilities at Syphon and proposed at Ameria and Zeonon should be expanded.
8. Public relations activities should be expanded, including educating the public not to misuse sewers. (This was also mentioned in EQI evaluation as proposed part of WO 4A.)
9. Reduce overstaffing by encouraging early retirement and hiring ceilings. In the long run, certain aspects of wastewater treatment should be privatized and a public company should be created which is able to raise its own revenues and given a substantial measure of autonomy by the government.
10. In the short run, institutional obstacles to a successful training program can be partially overcome by:
  - giving higher priority to management system implementation already in WO 4A.
  - GOSD making every effort to spend up to budget.
  - Ministry telling GOSD early in the year what their foreign currency allocation will be so urgently needed spare parts can be ordered.
  - WO 4A's assisting in preparation of budget bid to Ministry of Finance.
  - USAID working directly with GOSD on O&M matters.

## Lessons Learned

1. In order for training to be effective, trainees must be motivated to use the newly acquired knowledge, the training must be regularly reinforced, and follow-up checks must be made.
2. A training scheme can be successful only if it is supported by management and fully integrated into the management systems of the organization.

J. MISSION COMMENTS:

Despite substantial revisions, this evaluation remained poorly organized and non-responsive to some key questions in the scope of work. Even though most of the recommendations appear reasonable, they rarely flowed from a findings/conclusions/recommendations paradigm, raising questions about the process by which they were arrived. According to the project officer many recommendations are "straw men" in that they were already in the works under the aegis of W.O. 4a before this evaluation was undertaken.

These criticisms notwithstanding, the evaluation did provide potentially useful insights into the requirements for and impact of O&M training and the constraints to its persistence in the wastewater sector. Mission staff are encouraged by the finding that O&M training does improved sewer cleaning performance as long as O&M practices are reinforced by the use of performance monitoring checklists.

Doc. CSIOM Drafter LErikson/ABarkley/ys  
Disk Lottie Evaluation Reports- 2/21/1989

تقرير عن التقييم  
الذي تم في شهر سبتمبر ١٩٨٨  
لمشروع التشغيل والصيانة لجارى القاهرة (١)  
الوكالة الأمريكية للتنمية الدولية / حكومة جمهورية مصر العربية

تم إعداد التقرير لصالح وكالة التنمية الأمريكية بالقاهرة  
عقد مجموعة شركة واش ( WASH ) بند ٤٥٢

الملخص التنفيذي باللغة العربية

أكتوبر ١٩٨٨

7/10/88  
Cable Code #A  
10/10/88

## ملخص التقرير

---

### التدريب وتقييم الأداء

---

وقد تبين منذ بداية مشروع مجارى القاهرة رقم (١١) الإحتياج الشديد للتدريب كجزء من هذا المشروع - وقد تم تدريب حوالى ٤٠٠ متدرب فى التشغيل والصيانة والمساعدات المختلفة. هذا وقد تمت المرحلة التالية من التدريب خلال أعمال الإحلال والتجديد من ١٩٨٤ / ١٩٨٧ بعد تقدير الإحتياجات اللازمة والمسح الشامل للمشاكل ودراسة نتائج التدريب السابقة - وقد أخذ فى الإمتبار المستوى اللغوى والتعملى للتدريبيين وتم باللغه المعريية بواسطة مهندسى الهيئة كما شمل المساعدات البصرية والتدريب العمل كعوامل أساسية.

### التقييم

---

وقد كان من نتيجة التدريب الذى تم البدء فى إستخدام توائم التشغيل والصيانة الوقائية وإستمرارها كما قام المسئولين فى الهيئة والمكتب الاستشارى بالتقييم المستمر والمنتظم لمستوى الأداء وقد تبين تحسن ملحوظ فى التشغيل والصيانة.

### تأثير التدريب

---

تم تدريب حوالى ٦٠٠ من العاملين بالهيئة فى خمسة برامج تدريبية وذلك لصيانة وتشغيل محطات الطلبات لوحدة التوزيع الكهربائيه وصيانة وتشغيل محطات الروافع - والأعمال الكهربائيه لمحطات الطلبات وإصلاح الطلبات الفاطمة - وقد أثبت تقرير مكتب نومية الهيئة الدولى فى فبراير ١٩٨٨ إنخفاض عدد حالات الطنح فى مجارى القاهرة كنتيجة لهذا التدريب.

## جدوى التدريب وإستمراريته

وقد تأثر برنامج التدريب تأثيراً سلباً كنتيجة لفترة التوقف بين نهاية مشروع مجارى القاهرة رقم (١) والبدء فى تنفيذ أمر التشغيل رقم (٤ أ) - ومن العلوم أن التدريب يجب أن يكون له صفة الإستمرار مع كفاءة مساندة الجهات الإدارية لتنفيذه .

## إحتياجات للتدريب المستقبلية

إن نسبة بسيطة من العاملين لا تتجاوز (٦ - ١٧) هى التى تم تدريبها حتى الآن ومن الواضح أن هناك إحتياج شديد الى إمكانيات كبيرة للتدريب وخاصة فى المعدات التى سيتم التدريب العمل عليها وإجراءات ومهام الأمن الصناعى . . . . الخ .

كما أن هناك حاجة ماسة للتدريب الإدارى للمستويات المختلفة ويمكن تنفيذ ذلك فى الجامعة الأمريكية بالقاهرة ، وأكاديمية السادات للعلوم الإدارية ، والهيئات التعليمية الأخرى بالقاهرة (موضحة فى فقرة التقدير) والإستفادة منها .

ومن الواضح أن إمكانيات ومساعدات التدريب المتوافرة فى محطة السيلون غير وافية بالفرض المستهدف - ومن الضرورى أن يتم التوسع فى إمكانيات التدريب فى محطتى زين والأميرية لتشمل التدريب العام التخصصى .

## التشغيل والصيانة

بحلول عام ١٩٩١ سيزيد حجم المياه النقية المستخدمة فى القاهرة الكهري من سعة نظم الجارى القائمة والمستخدمه مما يستوجب أن يتم التشغيل بكفاءة كبيرة - وقد أوضحت الدراسة التى قام بها مكتب نوعية البيئة الدولى ( ) فى عام ١٩٨٨ أن مشروع مجارى القاهرة رقم (١) قد نجم عنه تخفيض حالات طمع الجارى بما يقارب الثلثين (٢/٢) - ولكن مازال ما يزيد من ٢ مليون شخص يعيشون فى مناطق لا تخدمها شبكات الصرف الصحى ولقد ثبت أن مشروع مجارى القاهرة رقم (١) بما يشمله من أعمال الإحلال والتجديد لمحطات الطلبات وما تبعه من تدريب - صيانة وقائية - توائم تشغيل وصيانة وأعمال التقييم

المستمرة للمحطات من ١٩٨٥ حتى ١٩٨٧ كُن له تأثير ناجح - و لكن توقف المشروع لمدة خمسة عشر شهرا خلال ١٩٨٧ - ١٩٨٨ بسبب التأخير في إصدار أمر تشغيل رقم (٤ أ) نجم عنه فقدان كثير من المكاسب التي تحققت - وهذا ينطبق أيضا بالنسبة لمحطات الروافع ومالية تنظيف المجارى لذا يلزم:

- إعادة استخدام قوائم وكشوف التشغيل والصيانة والتقييم.
- تدريب العاملين بقسم المتابعة والتقييم الذى بالهيئة بما يكفل قيام هذا القسم بأداء واجباته بكفاءة وتحمل مسؤولياته الكبيرة.
- عمل مسابقات سنوية بين المحطات لتحديد أكفء المحطات وأطقم التشغيل والصيانة . . . . الخ مع منح حوافز قيمة للفائزين.
- إنشاء ورشة رئيسية لإصلاح وميانة الملمبات كأستية أولى عاجلة.
- وضع أسلوب ناجح وكفء لطلب وتدريب تطع الفيار.
- وضع سياسة فعالة للأمن الصناعى بما فى ذلك المعدات والأدوات والتدريب عليها.
- توعية الجماهير بالنسبة لخطورة الإستخدام السئ لشبكات الصرف الصحى.
- وضع نظم للبناء بما يكفل عدم التصريح بإنشاء أى مباني بدون صرف صحى أو إنشاء مباني فوق غرف التفتيش.
- تحكم أفضل فى ناتج الصرف الصحى والمعامل اللازمة لذلك.
- إعداد خرائط تفصيلية وسليمة لخطوط الصرف الصحى.
- إنشاء مخازن لمراقبات الصرف الصحى.

#### الموضوعات التنظيمية وتأثيرها على التشغيل والصيانة:

إن الأداء الكفء للهيئة العامة لمرئق الصرف الصحى للقاهرة الكبرى لواجباتها ومسئولياتها تعترضه صعوبات وإختناقات كثيرة نخص بالذكر منها عدم توافر الشخصية الإمتبارية والتي تمكنها من توفير العائد الخاص بها ولذا:

- يجب أن تبذل الجهود اللازمة لتحويل الهيئة الى شركة تطاع عام بما يمكنها من تديير العائد اللازم لها.
- أن يتم التعاون بين الهيئة ووكالة التنمية الأمريكية فى موضوعات التشغيل والصيانة.

## الميزانية:

الميزانية المعتمدة للهيئة تقل كثيرا عن الميزانية المطلوبة والمقترحة بواسطتها وبرغم ذلك لا يتم صرفها بالكامل. كما وأن تدير المكون الأجنبي لإستيراد قطع الفيار وأي احتياجات أخرى تقابل صعوبات كثيرة. وموضوع غير متيقن التنفيذ لذا يلزم:

- أن تعمل الهيئة على صرف الإمتدادات الممنوعة لها بالكامل.
- الإستفادة بالخبرات المتوافرة في المكتب الإستشاري في إمداد الميزانية.
- إخطار الهيئة مسبقا بتفصيل النقد الأجنبي المخصص لها حتى يمكنها مداركة احتياجاتها في الوقت المناسب.

## الأفراد:

أعداد العمالة المتوافرة في الهيئة كبيرة بمسفة عامة - ولكن يوجد نقص في بعض المجالات لذا يلزم:

- تدريب أفراد الإدارة العليا تدريباً إدارياً مناسباً.
- تعتبر الأعداد الموجودة حالياً الحد الأدنى المطلوب للعمالة.
- إستخدام نظم المعاشات المبكرة للعاملين (سن ٥٥ عاماً) لتقليل أعداد العاملين.

## التكاليف التقديرية:

وموضح بالتقرير التكاليف التقديرية للتدريب الأضافي المطلوب وكذا مساعدات التدريب اللازمة وكذا للمعاونة في أعمال الصيانة والتشغيل للمعدات الجديدة إلخ علاوة على المعاونة في الأعمال التنظيمية ويبلغ إجمال هذه الإمتدادات الرأسمالية بلغ ٨٠٠.٨٠٠.٠٠٠ دولار علاوة على إعتداد سنوي يقدر بـ ٢٨٥.٠٠٠ دولار ( بإستثناء التدريب ) وذلك من إعتدادات أمر التشغيل رقم (٤ أ) أو من أي جهة أخرى وذلك لحين تمكن الهيئة تدير الإمتدادات اللازمة لها ( الإمتدادات السنوية المطلوبة للتدريب في الملحق ٤).

## نظرة عامة:

من الواضح أن مشروع مجارى للقاهرة رقم (١١) قد أدى الى تمهين للتشغيل والصيانة للفملى لنظم مجارى للقاهرة ولكن مازالت هناك بعض أوجه القصور فى محطات الطلمبات والتسليك الميكانيكى رغم التحسن النسبى الذى طرأ عليها ويمكن ارجاع التحسن الى مجموعة من العوامل من أهمها تركيب معدات حديثة والتدريب وإستخدام قوائم التشغيل والصيانة وتقييم أعمال للصيانة الورتائية وحسن الارشاد الإدارى.

وقد أدى إنتهاء مشروع مجارى القاهرة رقم (١١) والتأخير فى أمر التشغيل رقم (٤ أ) الى إنتكاسة حقيقية ولكن البدء فى تنفيذ أمر التشغيل (٤ أ) يعطى الفرصة لتمويض ما فقد سابقا فى ظل جو هام من الإدارة العليا المتيزة لهيئة الصرف المسمى مع توافر التنسيق والإتصال المشر بين الأطراف المعنية

## تقدير

---

تود مجموعة العمل أن تقدم خالص شكرها وتقديرها الى العاملين بالهيئة العامة لمرئق المصرف الصحى للقاهرة الكبرى والجهاز التنفيذى لمشروع المصرف الصحى بالقاهرة الكبرى والوكالة الأمريكية للتنمية الدولية والمكتب الاستشارى الأمريكى الإنجليزى (أمبريك) على كريم إستقبالهم وتعاونهم وعلى بذل الوقت والجهد الوفير لإمدادنا بالمعلومات المطلوبة.

كما نود توضيح بعض المؤسسات التعليمية بالقاهرة والتي تقدم برامج تخصصية متنوعة فى الإدارة والشؤون المالية وباقى النواحي الإدارية والشؤون الفنية والتي قد تكون ذات فائدة كبيرة للهيئة العامة لمرئق المصرف الصحى للقاهرة الكبرى.

- أكاديمية السادات للعلوم الإدارية.
- جمعية إدارة الأعمال العربية.
- المركز العربى للإدارة والتنمية.
- دار المعارف - المركز الإلكتروني لإعداد البيانات والتدريب.
- الجامعة الأمريكية بالقاهرة.
- مركز الدراسات التخطيطية والمعمارية.

Ahmad Abdel Salam	Engineer Mechanical Sewer Cleaning Division
Hassan Mabrouk Abdallah	Maintenance Engineer, Vehicle Repair Shop
Ahmed Aly	Engineer Sewer Cleaning
Aly Afifi	Engineer Sewer Cleaning Repair Shop
Madeline Labib Henein	Chemist (Work Order IYA)
Mohamed El Sayed	Supervisor of the Submersible Pump Workshop
Abdel Aziz Mohamed Shahri	Supervisor of the Syphon Pumping Station
Ahmed El Shazly	Mechanic Submersible Pump Station Workshop
Yehya Abdel Fattah Mohamed	Operation Worker Syphon Pumping Station
Abdel Malek Abou El Fattah	Electrician Submersible Pump Workshop
Wagih George	Industrial Safety Official Submersible Pumps Workshop
Mohamed Abdel Wahid	Gamasa Station
Salah Wanis	Giza Station
Abdel Salam	Dayoura Station
Samir Abdel Menelm	Head of Training Division

Sample of Trainees Interviewed:

Eng. Said Ibrahim El Zomor  
 Ahmed Mohamed Yehya  
 Fathy Hussein Aly  
 Gomsa Refay Hussein  
 Bayoumi Mohamed Mahmoud  
 Awad Abdel Ghani Mahmoud

## **B. USAID**

Fred Znbrist	Associate Director Development Resources
Hassan Hassan	Office Director U.A.D.
Sally Patton	Project Officer
Mike Gould	Chief of Division Cairo Branch U.A.D.
Yikha Molldrum	Evaluation Officer
Kass Kawata	Consultant
Safwat Bishara	Cairo Sewerage 2
Tarek Bekhelt	Program Development Support

## **C. AMBRIC**

Chuck McElroy	Chief of Project LA
Eric Duffey	Institutional Development Specialist
Tim Swayne	Assistant Project Director East Bank Work <sup>3</sup>
Wayne West	Training Coordinator
Ken Stumpf	Operation and Maintenance Specialist
Paul Gustafson	Unsewered Areas Project
Buck Osteen	Environmental Engineer
Hassan El Hosseini	Computer Training Specialist

## **D. OTHERS**

Salah Issawi	Under-secretary Training Department Ministry of Housing & Reconstruction
Rifki Hassan	CWO
Matt Antill	Former Training Coordinator of AMBRIC
Youssef Rizkallah	Former Director of O & M in GQSD, currently Trainer in the Ministry of Housing

**APPENDIX C**  
**TRAINING PROGRAM PRESENTED**

TITLE	GOSD PERSONNEL ATTENDING					
	ENGINEERS	SUPERVISORS	MECHANICS	ELECTRICIANS	OPERATORS	TOTAL
Pump Station O & M Training	8	14	181	43	24	270
Electrical Short Course Training for Pump Control Panel Rewiring	8	5	0	7	0	20
Ejector Station O & M Training	0	8	71	0	67	146
Technical Training Course for Pump Station Electricians (Trainee data as of 11/12/86, this training is still ongoing)	23	17	0	31	0	71
Technical Training Course for Submersible Pump Repair (Trainee data as of 8/12/86, this training is still ongoing)	13	18	51	1	4 (a)* 1 (b)**	88
<b>TOTAL</b>						<b>595</b>

\* a = Assistant Mechanics  
\*\* b = Laborer

**APPENDIX D**  
**REFERENCES**

- Evaluation of Cairo Sewerage I - Rehabilitation  
by EQI

February 1988

- Rehabilitation and Expansion of the Greater Cairo Wastewater System  
WO IVA

January 1988

- The Greater Cairo Wastewater Project Operations and Training  
Wayne West, Paul L. Gustafson, Fred A. Zobrist, Eng. Attala Safwat  
Water Pollution Control Federation L.A. California

October 1986

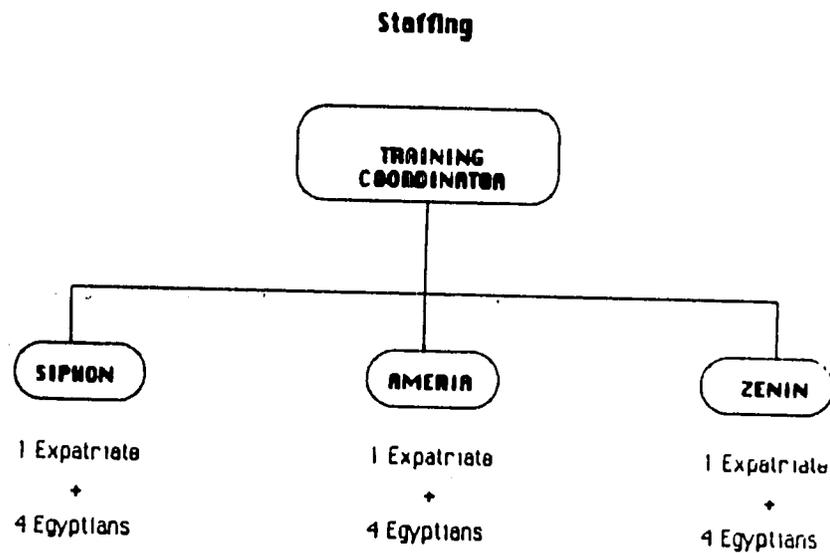
**APPENDIX E**  
**TRAINING COSTS**

**Long-term Training:**

AUC - Graduate Degree Program (5 years) cost would be approximately \$ 2,000/yr/ person x 15 persons/year for 5 years = 75 persons over a 5 year period @ \$ 10,000/ persons = \$ 750,000.00. Persons participating in this program would be those identified as having capability for the executive management track. One decision properly made by one of the participants in this program after reaching an executive position in the organization would more than justify the cost of this program.

Year	1	2	3	4	5	6	7	8	9	0
Participants*	15	30	45	60	75	60	45	30	15	0
Cost: US \$ (000)	30	60	90	120	150	120	90	60	30	0

**Short-term Training :**



Costs:

4 Expatriates	- \$ 200,000 each (includes overhead)	= \$ 800,000
12 Egyptian staff	- \$ 10,000 each/yr (includes overhead)	= <u>\$ 120,000</u>
		\$ 920,000/yr

These persons would be responsible for administrative, technical, production (manufacture of training materials, training of trainer (TOT) training; manuals, audio-visual tapes, etc.) and all other short-term training interventions.

**Equipment**

Audio-visual (including VCR's and Cathode Ray Tubes)	= \$ 200,000
Copiers, typewriters, etc.	= \$ 50,000
Transportation - (3 vehicles/training center + spare parts + insurance, shipping costs, etc.)	= \$ 225,000
Annual Maintenance + Insurance/Vehicle	= \$ 45,000/yr
Training/Office Supplies	= \$ 25,000/yr
Computers	= \$ 80,000
Annual Maintenance	= \$ 10,000/yr
Ten Training Terminals + CPU	= \$ 100,000
Annual Maintenance	= \$ 10,000/yr

**Facility**

In order to prepare the three facilities (Ameria, Siphon, and Zenin) for operation and training, the following are "ball park" estimates of the costs:

Siphon (Expansion + Rehabilitation)	\$ 100,000
Ameria	\$ 500,000
Zenin	<u>\$ 500,000</u>
	\$ 1,100,000

In subsequent years, annual upkeep and maintenance is estimated at approximately \$ 20,000/yr/facility.

It should be borne in mind that while these costs may appear large at the outset, they are normal start-up institutionalization costs (facility, staffing, equipment, etc.). As the program continues these costs are reduced and the unit cost/student for training is reduced. The estimated benefits of this investment in training are that:

1. the number of persons receiving training will be three (3) times greater per year than the total number trained in all the training interventions to date.
2. the length of training per trainee will be the equivalent of one (1) month/year as compared to one (1) week/year previously.
3. Class size will be approximately 10 trainees/class allowing for personalized, practical training.
4. A cadre of trainers will be developed, thus expanding the breadth of training and further institutionalizing training as a part of the organizational structure.
5. Providing mid-level and upper management with training in current techniques of supervision, personnel, financial, problem-solving and other aspects of management.
6. A more knowledgeable workforce which will perform more efficiently and be a better position to sustain the project once donor participation ceases.

**Summary of Annual Training Costs  
in US \$ (000)**

<b>Year</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>AUC</b>	30	60	90
<b>Staff</b>	920	920	920
<b>Audio-visual</b>	-	-	-
<b>Copiers</b>	-	-	-
<b>Transportation</b>	-	45	45
<b>Supplies</b>	25	25	25
<b>Computers</b>		10	10
<b>Terminals</b>		10	10
<b>Facility</b>		20	
	-----	-----	-----
	<b>975</b>	<b>1,090</b>	<b>1,120</b>

**N.B.**

Start-up capital costs of \$ 1,625,000 are included in Chapter 5 p. 35.

**APPENDIX F**  
**PRESENTATION OF WORKSHOPS REPORT**

As part of the evaluation, two workshops were held to discuss their findings. These were held in the conference suite at the President Hotel, Zamelek, Cairo on the 3rd and 4th of October 1988.

The first of these on the 3rd of October was presented to 33 participants made up as follows:

USAID	4
Vice Chairman of GOSD	1
Middle Managers of GOSD	14
WD IYA Contract Staff	8
WASH Team and Support	5
EQI	1
	-----
<b>Total</b>	<b>33</b>
	=====

The workshop first dealt with training. After a short introduction on training methods the participants divided into groups to list the principal training problems of GOSD and their perceived solutions.

This produced a consolidated list of problems and solutions as follows:

- No commitment to training by management and trainees i.e. lack of motivation.
- No continuity of training, not coordinated with actual work of trainees, no follow up or feed back.
- Insufficient budget for training, hence lack of materials and equipment.
- More full time, high quality trainers required.
- More on the job training
- Adequate specialized training center needed, fully equipped.

- Not enough types of courses covering all departments.
- Level of training not high enough to meet real needs of trainees.
- Training in new AMBRIC works needed on O & M before taken over.
- Difficult to apply acquired skills in the workplace due to lack of tools and spare parts.
- Problems relating to training illiterates.
- Management training required.
- Training in English required.
- Timing of training to suit shift times etc.
- Training incentives required.

In addition to these problems, the following suggestions were also made:

- All managers should be surveyed for their suggested training needs of them and their staff.
- Workshop required for the overhaul of diesel engines.
- Stores handling needs computerization.
- General need for computer based systems.
- New pump repair workshop required.

An attempt was then made to see which problems could properly be assisted by WO IYA.

The training session concluded with a slide presentation on the principal conclusions and recommendations of the evaluation study. The slide presentation continued with the achievements and remaining problems of O & M support followed by a presentation of the principal conclusions and recommendations of the evaluation study.

Participants were invited to select the most important points either in or out of the evaluation to be conveyed to the senior staff workshop on the following day by the Deputy Chairman General Nasser. These points were:

1. The need for an adequate training budget.
2. The need for a comprehensive set of training programs at all levels.
3. Training in O & M of the new works being built by AMBRIC before they came on stream.

4. The need for an adequate fully equipped training center.
5. The need for the upgrading of sewer cleaning equipment.

At the conclusion, participants completed an evaluation form for the workshop with the results shown on the consolidated form.

The second workshop, at the same venue, on October 4th was held to present the main conclusions of the evaluation report to senior staff of GOSD, AMBRIC and other governmental officials and USAID staff as follows:

USAID	3
Chairman General Sewelam of GOSD	1
Senior staff of GOSD	6
Senior staff of AMBRIC	3
(Others list): Director of CWO	1
Head of Projects Division CWO	1
Under-secretary for Planning Affairs, Cairo Governorate	1
Director of EQI	1
Evaluation team support	5
	-----
<b>Total</b>	<b>22</b>
	=====

The recommendations on training, O & M support and institutional support provoked a lively and useful discussion.

At the conclusion Mike Gould, Chief of Division of USAID, indicated that a copy of the report, when received would be handed over to AMBRIC WO IYA staff to see which recommendations would fall within the scope of assistance under WO IYA.

General Sewelam thanked all those that were assisting GOSD in the major task of meeting the challenge presented by the carrying out of the effective drainage of Cairo.

**SUMMARY OF REPLIES**

**USAID WORKSHOP EVALUATION FORM**

**OCTOBER 1988**

**1. How successful has the workshop been ? (Please tick) /**

Very successful .....	11
Reasonably successful .....	10
Not very .....	2

**2. In What ways could it have been improved ?**

- Advance notice of Questions and Agenda.
- Aims could have been clearer.
- Not long enough. Better visual aids and room layout.
- Participants informed about WD IYA in advance.
- Not all sectors of GOSD covered.
- Report not an end in itself. Hope it will be implemented.

**3. How do you rate the sessions ? (Please tick) /**

**PERFORMANCE MONITORING AND TRAINING:**

Low .....	2,5
Medium .....	8,5
High .....	10

25

**EXECUTIVE SUMMARY  
IN ARABIC**

These factors or variables are also a prerequisite to training persistence. Given the improvement in performance of the pump stations over the period during which evaluations were conducted and analyzed, it can be said that the training was not only effective but that its impact persisted. Training is an on-going process and in order for this or any other training intervention to persist it is necessary to have a continuing education mechanism.

## **2.6 Future Training Needs**

In interviews with GOSD, CWO, AMBRIC and AID personnel associated with the Cairo I Sewer Project, respondents were queried as to what supports they felt were critical to the future success of the program. While a variety of responses were offered, the following list of training needs was universal:

- More widespread training (electricians, mechanics, operators, etc.) - At present out of the total population of the GOSD workforce, only six to seven percent of the employees have received any training.
- Training designed for illiterate, innumerate employees - in order to assist them in understanding the significance of the work of the pump stations and the importance of carrying out their job responsibilities.
- Adequate spare parts at the work site - As a reinforcement mechanism for the conceptual classroom training, it is necessary to provide hands-on opportunities to understand the practical applications of the theory. The absence of spare parts and the procedural difficulty in obtaining them is a major complaint and is crucial to the success of any present or future training intervention.
- Safety training and equipment - Since 1985 six GOSD employees have perished due to inadequate understanding of the role of safety, and the lack of safety equipment. Other employees have been involved in various types of accidents but statistical information on these events is not kept.

- Indigenous trainers - A cadre of Egyptian trainers must be developed who have the ability to translate, decode and communicate conceptual and practical information to GOSD employees.
- Management training - The overwhelming majority of GOSD management has an academic background in engineering. While engineering is a profession which enjoys high esteem in the society, it does not necessarily prepare them to be managers and motivators of the personnel under their leadership. While there are many capable managers in GOSD, managerial training will provide the skills and techniques necessary to enable employees to reach their maximal potential.
- Incentives - Discipline is a useful and necessary management tool and can motivate workers to do their assigned work. However, it is much more desirable to motivate through pride rather than fear. One way of providing this motivation through pride and reinforce training is by personal recognition. When deserved, verbal recognition of a worker for having learned well and done good work, in front of fellow workers, will instill great pride in that individual and motivate his fellow workers to strive for the same recognition.
- On-site training - Many managers complain that the workload at their pump station is so severe that it is impossible to send personnel off-site to a training facility. In cases where three shifts are operating, 2/3 of the workforce have no access to training at all. In instances such as this, training on-site could be provided to at least two shifts while allowing workload requirements to be met.
- Training center - Presently, training is conducted at the Siphon training center. In this facility, computer, electrical, mechanical, and other types of training are occurring simultaneously in an area that is barely suitable for one of these activities alone. Attention is an immutable prerequisite for learning and the distractions, which are interminable in this small, cramped, crowded facility, are uncomplementary to the training process. A larger, fully equipped training facility would not only aid the process of learning/training but would allow greater access to training to more trainees in the various categories than is presently the case.

- Budgetary support - Since 1986, GOSD has not received any external budgetary support for its training activities. In fact, at the end of the last period of support from AID, all materials were withdrawn (e.g. copier machines, paper, etc.). Since that time, GOSD has provided LE 1,000 per year in an attempt to continue this vital function. Two facts are clear: this level of funding for training is woefully inadequate and in order for training to continue and survive sufficient donor funded facilities and financial support must be made available.
- Arabic-Speaking Consultants - To the extent possible, consultants who are fluent in Arabic should be made available for this and other projects.
- Commitment - A strong commitment must be made by GOSD to maintain continued emphasis on training for all levels of the organization. GOSD must make provisions for using training modules that have been designed and implemented on a continuing basis to train new employees and reinforce the training of existing staff through repetition.

It is hoped that the above future training needs will be addressed and given high priority under Work Orders IYA.

## 2.7 Recommendations:

- In addition to sending staff to existing management training courses, a graduate program in management should be developed in conjunction with the American University of Cairo which could be offered to qualified engineers and technical staff who are filling, or who will be filling management positions with GOSD or other Egyptian public utilities. A preferred approach would be for participants to attend the program on a part-time basis while remaining in full-time employment. By attending the masters degree program on a part-time basis it would take a minimum of three years to a maximum of six years to complete thus ensuring GOSD a reasonable amount of guaranteed service from the employees in return for GOSD's subsidization of the cost of the employee's participation in the program. A mechanism of this sort would go far in developing a cadre of trained managers.

- Until the new central training centre is provided, proposed facilities at Zenin and America should be expanded and utilized as general and as specialized training centers. Siphon should also be expanded.

## CHAPTER 3

# IMPACT OF PERFORMANCE MONITORING AND TRAINING ON OPERATIONS & MAINTENANCE

### 3.1 General

Clearly the effective operation and maintenance of the original, the rehabilitated and the new elements of the Greater Cairo sewerage and wastewater treatment plants are a vital element in the future strategy of the city.

The efforts of 85% - 90% of the 10579 GOSD staff are devoted to this end.

Nor does the task stand still, by 1991 the clean water put into supply will reach 6 million cubic metres a day ( $m^3/d$ ) and allowing for 70% entering the sewers a reception capacity of 4.2 million  $m^3/d$  will be required.

The capacity of the sewerage system then will be:

New system	1.2 million $m^3/d$
Old system	<u>2.1</u> million $m^3/d$
Total	3.3 million $m^3/d$

It will be seen that the O & M of the system will have to be at maximum effectiveness if major problems are to be avoided.

This shortfall in system capacity also shows the wisdom of retaining the old pump stations on a care and maintenance basis.

A considerable effort was made in Cairo Sewerage I to rehabilitate both the primary and secondary collector systems and to rehabilitate nearly half of the existing 104 pump stations. Equipment and management assistance was given to clean out accumulated debris in the sewers and as the EQI Evaluation of early 1988 shows the incidence of flooding has been significantly reduced (See Table 2).

In spite of this, remaining problems need to be tackled under WD IYA.

Another part of the project where progress remains to be made is the unsewered areas. Over 2 million people live in areas without access to sewerage and major developments, including multi-storey apartment blocks, continue to take place with no access to sewer.

**TABLE 2**  
**NO. OF FLOODED AREAS OBSERVED IN 8 DISTRICTS**  
**UNDERSTUDY IN SEPTEMBER - OCTOBER 1987**

Name of Neighborhood	*No. of Flooding Areas		Comments
	In 1981	In 1987	
1. El Mounira (Tahrir/Taleat Herb)	10	6	2 chronic areas
2. Abou Hariera/Sekket Mekki	14	5	2 chronic areas
3. Nozeh/Shorafa (El Sakakini)	13	3	Not chronic
4. Kelet El Kebah (Baghla)	6	3	All 3 flooded are chronic
5. Geziret Badren	3	1	1 chronic not in original area
6. Al Awkef City	10	1	Not chronic
7. Abou El Seoud	10	3	1 chronic - Tanneries (Industrial waste disposal in the system)
8. Zolfaker	1	1	Not chronic
<b>Total</b>	<b>67</b>	<b>23</b>	<b>11 chronic areas</b>

\* Source: AMBRIC - Pre-design Reports, General Summary of Drainage Areas and Proposals 1981

**NB:** Chronic flooding refers to a situation where sewage overflows the system causing pondage over the ground, in an extended area which never dries up. This situation is recurrent.

32

## 3.2 Current Pump Station Performance

After the good results reported from the 6 evaluations carried out by AMBRIC, as part of Cairo Sewerage I, of the 49 rehabilitated pump stations it was disappointing to observe a declining trend of performance in the stations visited.

Much of the decline can be attributed to the hiatus in AID input from the end of Cairo I in 1987 to the start up of WD IYA in June 1988.

This is confirmed by a start up re-evaluation of a sample of stations carried out by AMBRIC under WD IYA staff.

Figure 1 shows Pump Station Area Performance of the 6 evaluations 1985-86 and the 1988 partial evaluation in chain lines. It will be seen that there has been a drastic fall off, none meeting even the original minimum acceptance level of 50%.

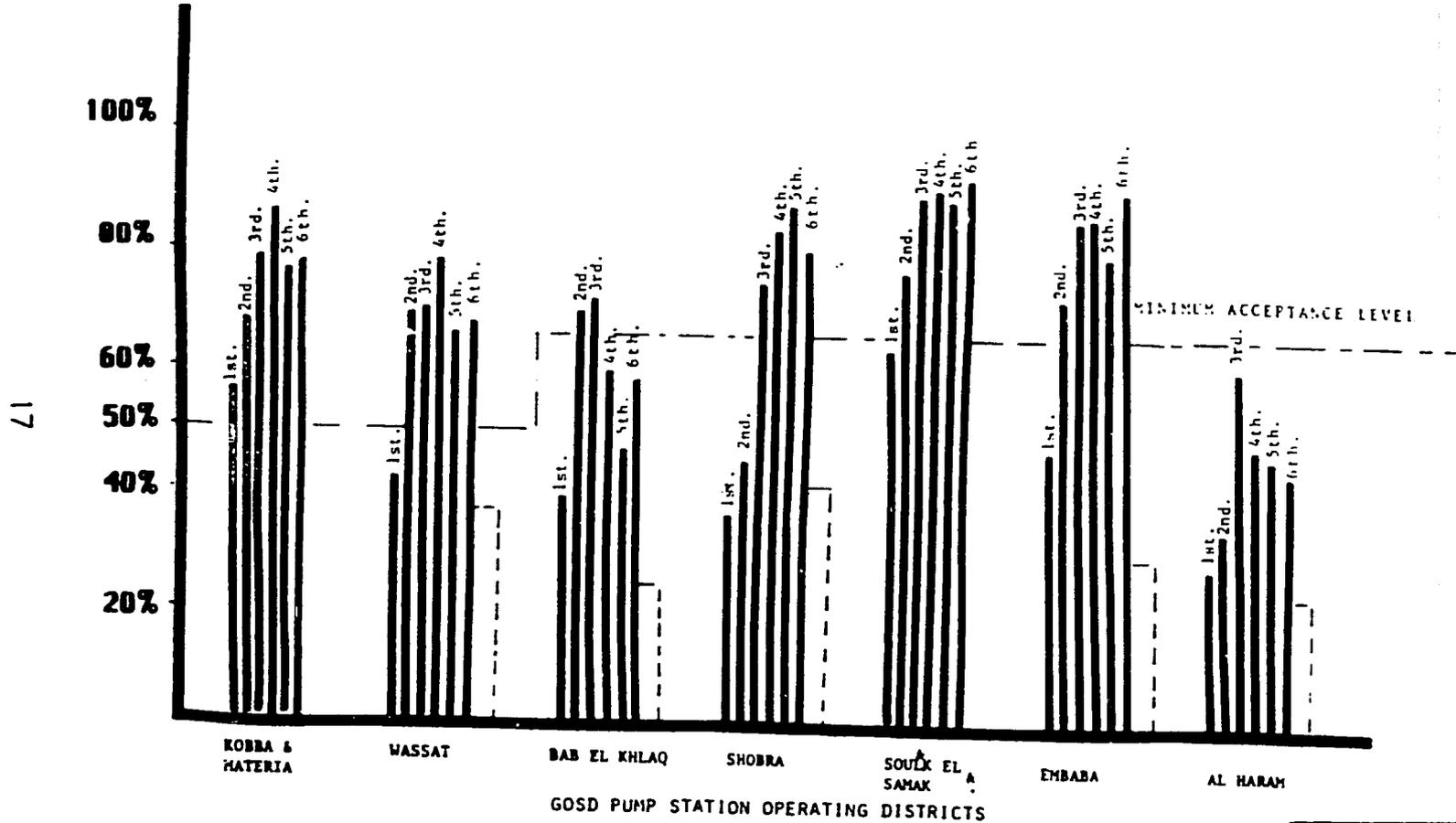
Obviously, the new stations are reasonably satisfactory and many of the old stations cannot be expected to be, but some old stations, due to self motivation by the superintendent are kept in reasonably good condition e.g. Saïda Zeinab, while some new stations lack safety equipment.

Among a long catalog of defects noted were:

1. Burnt out pump control panels due to fuses being by-passed with wire.
2. Water leaking back through pumps when shut off.
3. No identification on pumps, motors or electric control panels to indicate to the operators which pump the switch controls.
4. Most automatic float switches not used, pumps on hand control.
5. Cabling with bad connections looped on walls and floor with electric shock hazard.
6. Gate valves leaking.
7. Leaking pumps due to worn 'O' rings.
8. Pressure gauges not working.

FIGURE 1

PUMP STATION AREA PERFORMANCE



17

1st. Eval. period:	July 85	to	Oct 85
2nd. Eval. period:	Oct. 85	to	Dec. 85
3rd. Eval. period:	Dec. 85	to	April 86
4th. Eval. period:	April 86	to	July 86
5th. Eval. period:	June 86	to	Sept. 86
6th. Eval. period:	Oct. 86	to	April 87
Partial evaluation	- - - -		

24

9. Hatch way and vent openings for ejectors below ground level allowing water to enter the ejector chamber.
10. Minimal safety precautions: open chambers, manhole covers removed or cocked up, fire extinguishers either non-existent, empty or time expired, no or inadequate first aid kits, unguarded electric fans, broken glass.
11. No operations manual at any station visited.
12. Lack of tools to make minor repairs or adjustments.
13. Spare parts difficult to obtain for some makes of pumps.
14. Cumbersome procedures for obtaining spare parts.
15. Many stations without day to day schedules of pump operation.
16. Illiteracy of work force.
17. Cleanliness and hygiene below standard at almost all sites.
18. Little or no site security.
19. Changes of management staff at GOSD during the period 1986-8 means that senior staff were unaware that the evaluation program had existed.
20. Check lists fell into disuse at stations due to inability to obtain fresh copies of the form resulting from the very limited photo copying facilities at GOSD.
21. About 70 pumps, nearly one per station, awaiting repair at the very inadequate pump repair shop at Souk El Samak.

There are bright spots like the existing pump station at Ameria where the check list has continued in use and been expanded by the station engineer and has full preventive maintenance scheduled.

Where pump station performance has been maintained or improved it has been due to the presence in post of capable engineers with natural management ability and a high degree of self motivation.

It should be the aim of WDIYA to provide the climate in which such initiative can be developed and rewarded.

It also reinforces the view that a top down training plan is needed. Interventions at lower levels of management tend to wither unless higher management is knowledgeable and supportive.

### **3.3 Current Ejector Station Performance**

In the centre of Cairo as well as the normal pump stations there is a system of ejector stations, driven by compressed air, for the conveyance of wastewater.

The system dates from 1935 and originally consisted of 50 ejector stations of which 40 remain in use, as well as 3 air compressing stations and a compressed air network to the ejectors.

Given the age of the system, the need for ejector valves etc. to seat properly for effective operation, maintenance must need considerable effort. Another problem is that ejector stations are completely underground and vehicles parked over them prevent access to them.

In the CSI report dated April 1987, 19 maintenance and other problems were itemized with proposed solutions and reference was made to preventive maintenance check lists. However, only one evaluation at the end of 1986 was done, this was just as the CSI project ended and it is now stated by the Ejector Department that only breakdown maintenance is done.

Safety is again largely ignored. At the Maarouf Air Compressing Station, the station floor is saturated with oil and one machine was running with no guard over the rotating shaft.

### **3.4 Recommendations**

- The April 1987 report should be updated and its contents implemented.
- Check lists and evaluations to be reinstated for preventive maintenance.

- The Technical Evaluation Department should be trained in the use of the scheme and made responsible for its operation.
- They should be required to produce regular reports both upwards to the Head of O & M but also downwards to the participating areas.

### **3.5 Pump Station Performance Monitoring**

In order to maintain the major investment in Cairo Sewerage I represented by the 69 new or rehabilitated pump stations, a training and assistance program was provided. The needs assessment revealed that the performance of pump stations depended on other factors as well as staff skills and training and, out of this, an evaluation program was produced, which is detailed in Para 2.3.

The results obtained in the 6th and last full evaluation at the end of Cairo Sewerage I are shown in Table 1.

It is possible to demonstrate the difference between good and bad rated stations only at Ameria where before the stations were rehabilitated significant breakdowns averaged 10 per year. Since rehabilitation and the introduction of weekly, monthly, quarterly and annual preventive maintenance no significant faults have occurred.

No cost savings can be quoted as the costing systems etc. which would enable this to be done are to be designed under WO IYA and it will be some time before reliable cost data on which such a study could be based will be available.

The end product is reduction in Cairo sewer flooding. This is a problem foregone which cannot be costed and is a public benefit not a cost saving to GOSD.

It could, however, be assessed by using Landsat satellite pictures of Cairo which are available for the period covered by C.S.I. which with expert interpretation could give the annual areas flooded and measure the improvement obtained.

AMBRIC inspired evaluations ceased when CSI staff were withdrawn in 1987 as it had not been properly integrated into any GOSD management system.

As forms ran out and could not be replaced, enthusiasm ran out except in one or two areas where the effort was maintained or even improved.

With the start up of WD IVA, an inventory of all pump stations is being carried out and at the same time an informal check list evaluation is being carried out. Results so far are seen as a broken line in Figure 2. This shows the ground that has been lost due to the time lapse between AID interventions.

Another factor in the downturn is the unsatisfactory state of pump repairs and the necessarily limited impact of training due to the large numbers requiring training.

The scheme, however, is well conceived and does provide a good training model and could readily be transferred elsewhere, provided that it is supported by management and fully integrated into management systems of the organization.

### **3.6 Recommendations**

To regain lost ground and provide a firm base for the future the following is required:

- The Technical Evaluation Department should be trained in the use of the performance monitoring scheme and made responsible for its operation.
- They should be required to produce regular reports both upwards to the Head of O & M but also downwards to the participating areas.
- An annual competition should be run with prizes for the best station and the most improved station of the year. The prizes should be presented by the Chairman and given publicity. (N.B. A staff newspaper is needed for this and many other reasons).
- A new pump repair shop is of the highest priority.
- Improvement in the supply of spares, tools and equipment and a reduction in the cumbersome and time consuming stores procedures (This is stated to be in hand but evidence is lacking).

- Local budgets provided for day to day small items. (In the S. Zone with 30 pump stations the cash float is LE 100 !)
- Safety and security equipment and standards are almost non-existent. A GOSD safety and security policy, a proper scale of equipment, safety training and safety exercises are urgently needed.
- A major increase in the scope and numbers of training is required.

### 3.7 Current Sewer Cleaning Performance

The sewer cleaning program carried out under Cairo Sewerage I had, as has already been noted, (Table 2), a considerable degree of success.

Sewer cleaning has become a routine operation and crews have been allocated to carry out frequent cleaning where known problems exist. Cleaning programs are often interrupted to deal with emergencies but this is a fact of life in a public utility and crews would be under-employed if dedicated solely to emergencies.

The simpler tasks winch/bucket cleaning, catchpit emptying and manual rodding and sewer 'diving' are carried out reasonably effectively without significant over manning.

However, the more expensive items of plant are either under-employed or not used at all.

Two closed circuit television vans (CCTV) for sewer inspection have been supplied. These should be in daily use to inspect all new sewers for defects before acceptance by GOSD and to survey existing sewers to find defects, illicit connections etc.

Before being used, the sewer should be jetted to clean it and remove obstacles. This was not done and it is obvious that CCTV has not been used for some time.

Although managers complain of lack of equipment, jettors seem only to be used in emergencies and two jettors are laid up at the New Garage for lack of a parts list to order spares, a problem solvable in 5 minutes by an air letter to the makers quoting the chassis number.

21

There must be known bad areas that should be routinely jetted, thus, releasing winch gangs for work in other areas.

There are areas which have never been properly cleared. In the 3rd collector a large number of manholes have been buried and cannot be found using box finding equipment. This also applies to the second collector where manholes are buried under ruins. There are also special problems at the Teret El Galad collector which need expert attention.

### **3.8 Implementation Problems and Recommendations**

- In the public domain sewers are constantly misused, blocked with rubbish, animal carcasses etc. A public awareness program is urgently required to educate the public in basic hygiene and the importance of the sewerage system.
- Improvements are needed in the building regulation and planning field. Not only are multi-storey apartment blocks built in unsewered areas but manholes are built over, sewers tipped over, and manhole covers buried by highway surfacing crews.
- A strengthened system of trade effluent control is needed with a laboratory, an adequate inspectorate, transport and effective penalties to ensure that effluent from factories reaching the sewer is free of gross solids and that heavy metals, chemical pollutants, aggressive acids or alkalis are removed and/or pre-treated effectively before entering the sewer and that proper charges are paid for treating sewage of higher B.O.D. or S.S. than domestic.
- A program properly to map the Cairo Sewerage system possibly in conjunction with the digital mapping pilot project of the Governorates of Greater Cairo (GGC).
- In view of the level of sewer blockages more use should be made of jetters, CCTV re-introduced and shift working introduced for sewer cleaning crews to maximize use of plant.
- Additional equipment and spares are required especially more and better trailers.

- The degrading and dangerous occupation of sewer 'diver' must be abolished as an urgent priority (N.B. Each manual cleaning gang as well as rodding sewers to remove blockages employs a man, almost unclothed, who on a rope enters the sewer and removes the blockages with his bare hands). The risk of drowning asphyxiation or disease especially the potential fatal Weils disease spread by rats urine must be high. He is consoled by a 10% bonus for this !
- The provision of a crew under a competent engineer to find, improve or build manholes on lines where existing manholes are lost and then to clear the blockages in them.
- Obtain spares for and re-activate the two sewer jettors at the New Garage.
- Replace the Souk El Semak sewer maintenance depot which is cramped and unsuitable by properly designed and equipped zone depots.
- Safety and security equipment and standards are almost non-existent. A GOSD safety and security policy, a proper scale of equipment, safety training and safety exercises are urgently required.
- The Technical Evaluation Department should be trained in the sewer cleaning evaluation scheme and made responsible for its re-introduction and operation.
- They should be required to produce regular reports both upwards to the Head of O & M but also downwards to the participating areas.
- Annual awards should be given for the best and most improved evaluation performances.
- Existing locally manufactured manhole covers and frames are of poor quality metal and much too heavy. A new cover should be designed based on best practice and arrangements made for quality assured manufacture.

### **3.9 Key Elements of the Assistance Program**

The success of the CSI Program lay in the blend of:

- capital works - the rehabilitation of pump stations;
- the provision of equipment - mechanical sewer cleaning equipment ;
- training - some 600 staff trained; and

461

- practical advice and systems implementation:
  - on sewer cleaning
  - check lists for preventive maintenance.

All were vital in the success.

The final element continuity and long-term monitoring was absent. CSI terminated abruptly in 1987 with systems not wholly implemented and the 15 month delay before the continuance as part of W0 IYA has been severely damaging in terms of loss of interest and changes of management leading to loss of awareness of the systems.

It is essential as part of W0 IYA that sufficient time is allowed for re-implementation of the performance monitoring and for its integration into the management system of GOSD. It is also desirable that its effectiveness is checked by USAID for as long a period of possible.

After W0 IYA staff are withdrawn the U.S. Twinning Authority provided for in W0 IYA could play a role in this regard, by discussing annual objectives with GOSD and by carrying out annual monitoring visits by one or two senior staff to assess progress and revise targets. It would be reasonable to expect USAID to fund air fares and subsistence costs for this.

## CHAPTER 4

### INSTITUTIONAL SUPPORT FOR OPERATION & MAINTENANCE

#### 4.1 General

The effective operation of the Cairo General Organization for Sanitary Drainage (GOSD) is subject to a number of constraints amongst them are:

- A population to be served of at least 12 million increasing at the rate of 300,000 a year, much of it in areas without sewers.
- Two million people already living in areas without sewers.
- A workforce of 10579 inadequately trained, poorly paid and as a result without sufficient motivation.
- An overloaded management structure with too many reporting to each senior manager and minimal delegation of authority and responsibility.
- The effectiveness of the professional staff hampered by lack of management training.
- GOSD as a government body subject to close regulation on pay, conditions and job tenure which inhibits the recruitment and retention of able staff and the removal of inadequate staff.
- Entirely dependent for revenue on grant from the Ministry of Finance.
- Revenue received covers salaries, wages, energy and consumables with very little available for training etc.
- A sewerage system, although the subject of very substantial aid for new major collectors, pumping stations and wastewater treatment plants, will, nevertheless, continue to require, very substantial maintenance costs due to the sandy environment, the lack of records and the poor condition of many sewers.

## 4.2 Organizational Structure

GOSD is a government body without any significant revenue of its own, tied to government salary scales and other conditions of employment and with insufficient management autonomy. This is clearly an obstacle to the long-term success of O & M (see Figure 2 and Table 3).

For example the expansion of sewer cleaning crews is hindered by the lack of vehicle drivers who cannot be recruited due to the low pay scales offered.

An effective long-term answer might be the creation of a Public Company able to raise its own revenues and given a substantial measure of autonomy by the government.

In the west activities like sewer cleaning and pump station maintenance are being privatized and this might be the subject of future consideration.

Under CSI where much of the emphasis was on capital expenditure USAID worked through CWO on works ultimately intended to be taken over by GOSD.

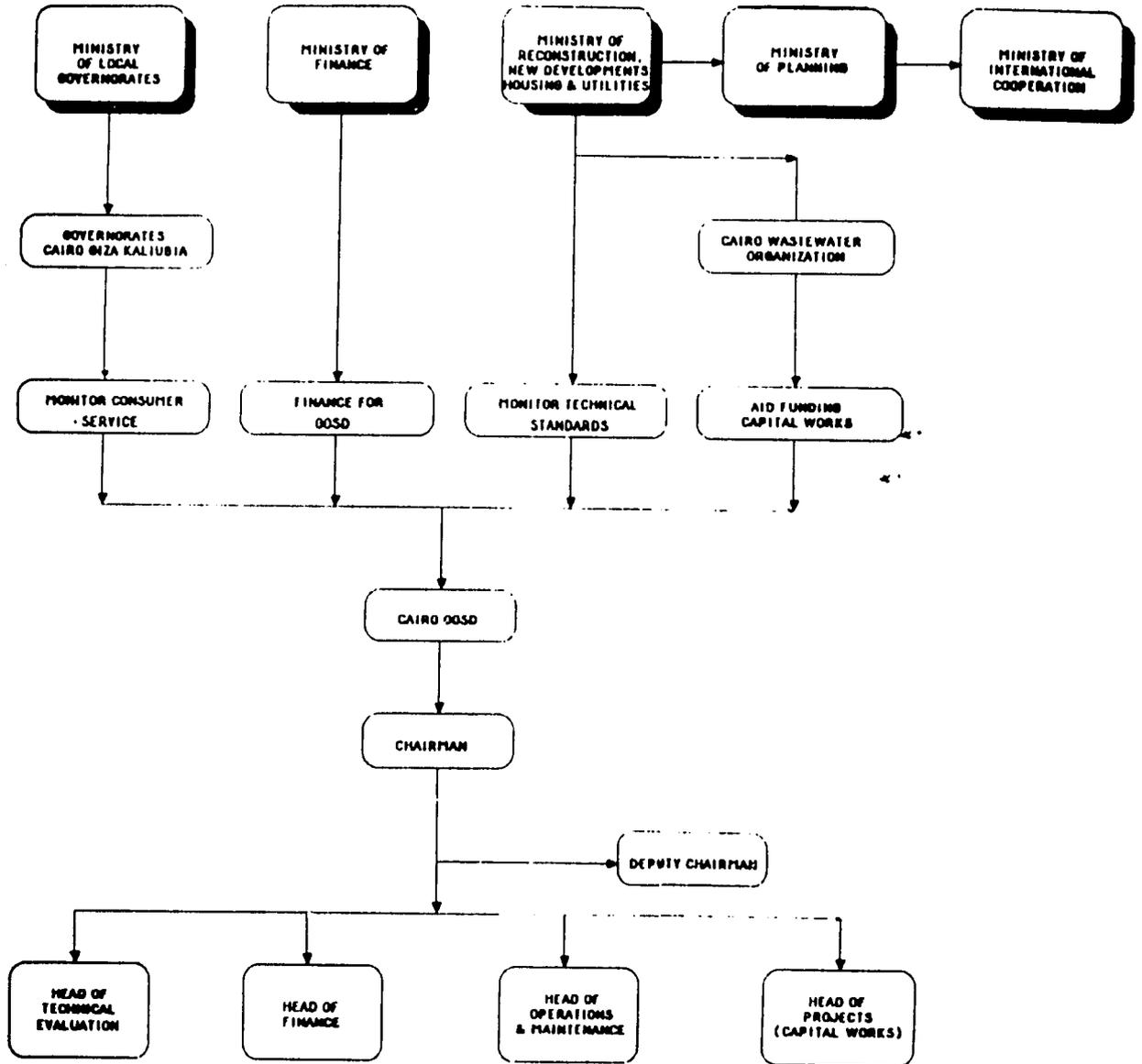
In the future, as far as O & M activities are concerned, there's seems little reason why USAID should not deal directly with GOSD. Collaboration between CWO and GOSD now appears to be good but the delay in starting up WO IYA may have been due to the bilateral procedure required.

## 4.3 GOSD Budget for O & M

General: The GOSD budget is shown in Table 4. A separate account is not kept for O & M but its cost may be inferred.

Assuming 90% of salary costs relate to O & M budget appears to be as set out in Table 5 for the year 1987-8.

**FIGURE 2**  
**EXISTING ORGANIZATION CHART OF GOSD**



1/5

**TABLE 3**  
**STAFF BY CLASSIFICATION**

<b>1. Specialized Cadre</b>	Engineers	275	
	Scientists	20	
	Agricultural Engineers	43	
		-----	338
<b>2. Administration</b>	Accounting	106	
	Admin. Development	68	
	Statistics	7	
	Security	2	
	Legal	33	
	-----	216	
<b>3. Intermediate Technical</b>	Engineering Support	467	
	Architecture	4	
	Technical Laboratory	8	
	Architecture - Nutrition	30	
	-----	509	
<b>4. Clerical</b>	Qualified	712	
	Unqualified	127	
	-----	839	
<b>5. Technical Labourers</b>			4278
<b>6. Support Staff</b>			4097
<b>Grand Total</b>			----- 10277

**Note:** This varies somewhat from the total current figure of 10579 but is the best available.  
The total number of posts in the staff establishment is 12,000.

4/10

**TABLE 4**  
**GOSD BUDGET**  
**FINANCIAL YEARS 87/88 & 88/89**

SECTIONS	YEAR 87/88		YEAR 88/89	
	Approved (LE)	Disbursed (LE)	Proposed (LE)	Approved (LE)
1. Salaries & Incentives	30.226.292	29.931.539	34.297.000	30.488.000
2. Operation, Maintenance, Training, Services, etc	7.926.000	7.177.940	16.734.750	7.249.000
3. Projects New & Ongoing	85.755.000	81.583.378	142.345.000	92.424.000
4. Loans & interests due to be paid + for Customs	8.417.000	8.417.000	24.278.891	23.557.000
				17.380.000
				40.937.000

111

The first point to note is that the budget is nearly LE 1 million underspent. This is a weak base to argue the case with the Ministry of Finance for greater funding.

Thus, in the current year funding, other than for capital works, which is almost entirely for O & M, has had its bid reduced from LE 51,031.750 to LE 37,737.000 which is less than the current year LE 38,152.292, in spite of a high level of inflation. The completion of GOSD generated capital works of LE 81 m during the year which will now need O & M, not to mention the AMBRIC works coming on stream, will further stretch this budget.

When the computerized management information systems to be installed under WD IYA are up and running, better budgeting data will enable a better case to be made to the Ministry of Finance.

In the meanwhile, every effort should be made to at least spend the sum allocated and perhaps WD IYA staff could assist in preparing the budget case to the Minister.

With current manning levels the budget is too small but might be more adequate if manning levels could be reduced and remaining staff better paid.

The amount of capital works built every year continuously extend the system requiring O & M. A rising O & M budget is essential if O & M is to meet its task.

A further problem in procuring tools, machinery and spare parts is the acquisition of the foreign currency needed to import these items. The O & M budget is in Egyptian currency and to get its equivalent in the appropriate foreign currency GOSD has to make a convincing case against other competing demands to the Governorate of Cairo and the Ministries of Local Governoretes, Planning, Finance and Housing. GOSD asked for LE 5.5 m for spares but were allocated only LE 1.5 m with a promise of more if foreign currency available, but nothing is known for certain. This explains why some spare parts take a long time to obtain.

**TABLE 5**  
**EXTRACT OF GOSD BUDGET 87/88**  
**DIRECTLY RELATED TO O & M AND TRAINING**

SECTION 2	Proposed (LE)	Approved (LE)	Disbursed (LE)
1. Materials	8.000	5.000	4.019
2. Fuel, Oil and Power Generation	3.626.300	3.702.500	3.564.773
3. Spare Parts & Tools	1.900.000	1.653.800	1.132.665
4. Stationery & Books	57.500	37.700	36.040
5. Service & Research Work	500	1.400	1.115
6. Printing Costs	20.000	20.600	20.263
7. Cost for Training Courses	9.560	2.200	1.570
8. 90% of Salary Costs	29.768.400	27.203.662	26.938.385
<b>Totals</b>	<b>35.390.260</b>	<b>32.626.062</b>	<b>31.698.030</b>

### Recommendations:

- Give higher priority to the management system implementation already in WO IYA.
- GOSD to make every effort to spend up to budget.
- GOSD to be told early in the year what their foreign currency allocation will be so that urgently needed spares can be ordered.
- Consideration that WO IYA assist in preparation of the budget bid to the Ministry of Finance.

#### **4.4 Personnel**

Information provided on the manning levels at pump stations, workshops and other sites compared with those which would be considered adequate on similar sized sites in the west indicate a high level of manpower some of which is obviously accounted for by skill shortages and the national need to sustain a high level of employment.

When the organization and manpower plan being prepared as part of WO IYA is in place the problem will arise, given government employee security of tenure, as to how reduced manpower and cost savings are to be achieved.

- It is recommended that in the higher echelons, able staff willing to undergo management training be slotted into posts in the new establishment. Others should be transferred to a supernumary list and as they retire the post be abolished.
- It is recommended that an immediate ceiling on numbers at the present level is imposed.
- The Government Law allowing retirement at 55 with certain pension rights be used to encourage as many as possible 55 over to retire without replacement.

#### **4.5 Publicity Internal and External**

The Public Relations activities of GOSD need urgently to be expanded. In the public field to educate the public not to misuse sewers for example and internally by means of a newsletter to raise staff morale and to highlight meritorious performance (see also 3.6 recommendations).

#### **4.6 GOSD Management Views and Perception on Training and its Impact on O & M**

Although everybody in the different echelons of management personnel agree about the necessity of continuous training for all levels of the workforce, still they differ very widely about the effect of the training carried out either by GOSD or AMBRIC in improving actual operations and maintenance of the sewerage system. This is largely due to the following:

1. Shortage of funds allocated for training in GOSD budget, which was LE 1,570 in 1987-8.
2. Disruption of technical assistance including training provided by the consultant for about 15 months.
3. Non existence of a policy for training, identifying targets, means, programs, personnel, etc.
4. The existing training centre at Syphon is totally inadequate and the small training staff with their tiny budget deserve great credit for the training they have achieved but it is totally inadequate to meet the need.
5. The low priority given to training vs. construction, design, O & M activities which is a common feature in governmental organizations.
6. The illiteracy of much of the work force.
7. No incentives, promotion or any kind of reward related to successful training.

So as to achieve a significant improvement in training, a long term policy for training should be constructed, an adequate budget should be allocated in GOSD and in WYO IYA starting a powerful, enthusiastic, energetic department for training and giving priority to training activities as they are the back bone for success in any sphere of work.

## CHAPTER 5

### RECOMMENDATIONS AND ESTIMATED COSTS

The recommendations and costs refer to those in the previous paragraphs mentioned and are to meet the requirement to institutionalize the recommended program and to ensure that long-term benefits ensue .

N.B.

- Estimated costs are only given for items not at present in the WO IYA program or are modified.
- Estimates in the time available can only be 'ball park' figures.
- All are at 1988 prices.
- In the case of annual costs these will continue for as long as AID funds can be made available or until GOSD finances improve.
- If and when any of the recommendations are considered for Notices under WO IYA, it is essential that AMBRIC calculate in more detail and add inflation factors in the customary local format.

#### Recommendations

##### Chapter 2

##### Performance Monitoring and Training

(Additional to already provided in WO IYA)

	<u>Capital Costs</u>	<u>Annual Costs</u>
For details see Appendix E	\$ 1,625,000	-

### Chapter 3

#### Impact of Performance Monitoring and Training on Performance of Operations and Maintenance

	<u>Capital Costs</u>	<u>Annual Costs</u>
• Annual competitions for best station etc.		Awards cups, trophies could be gift of consultant or Twinning Authority
• New pump repair shop	\$ 500,000	\$ 25,000
• Safety equipment	\$ 300,000	\$ 30,000
• Trade effluent lab, inspectors, transport	\$ 2,500,000	\$ 50,000
• Sewer mapping	\$ 250,000	\$ 35,000
• Better sewer cleaning equipment e.g. trailers	\$ 150,000	\$ 30,000
• Manhole improvement program	\$ 50,000	\$ 25,000
• Replace sewer maintenance depot by 5 new zone depots	\$ 2,500,000	\$ 50,000
• Safety equipment for sewer cleaning	\$ 150,000	\$ 15,000
• Awards for best teams		Gift of consultant or Twinning Authority
• Better design of manhole cover	\$ 10,000	-

### Chapter 4

#### Institutional Support for Operation and Maintenance

• Pilot study of feasibility of privatising sewer cleaning and P.S. maintenance	\$ 20,000	-
• WD IYA staff assist in budget bid preparation		Within existing resources
• Ceiling on numbers and early retirement		NIL (Cost saving)
• Realistic publicity budget, newsletter etc.	\$ 25,000	\$ 25,000
<b>TOTALS</b>	<b>\$ 0,000,000</b>	<b>\$ 285,000*</b>

\* Excluding Training (see Appendix E).

## CHAPTER 6

### OVERVIEW

If the objective of the Operations and Maintenance interventions under Cairo Sewerage I was to improve the actual operation and maintenance of the Cairo sewerage system then it has undoubtedly been successful.

As the EQI study earlier this year shows flooded areas in 1987 were reduced by nearly 2/3 compared with 1981.

Pump and Ejector stations although still not maintained to a common standard are certainly more effective with fewer breakdowns.

Sewer cleaning is carried out on a regular basis although not frequently enough and a few areas remain blocked due to lost manholes etc.

This improvement was due to a combination of capital works in new pumps and sewer cleaning equipment, training, the check list and evaluations of preventive maintenance, and management advice.

Unfortunately, just when the check list and evaluations were beginning to show results CSI terminated and due to delays in the start up of W0 IYA a hiatus of 15 months occurred which was a setback and destroyed some of the gains.

W0 IYA with its flexible system of 'Notices' offers the opportunity to regain lost ground and to complete the process especially in view of the enthusiasm of top management and the good liaison arrangements already in place via the Executive Steering Committee.

It is hoped that the recommendations of this evaluation report will be a further useful means to this end.

## APPENDICES

**APPENDIX A**  
**MEMBERS OF EVALUATION TEAM**

J. Anthony Young	WASH (Team Leader)
A. Tarik Bnafa	-
Wefky Mansour	-
Iman Ghazalle	EQI
Youssef El Rafei	-

*Sh*

**APPENDIX B**  
**LIST OF PERSONS INTERVIEWED**

**A. GOSD (The General Organization for Sanitary Drainage)**

Mohamed Farid Sewelam	Chairman of GOSD
Mohamed Mohamed Nasser	Vice Chairman of GOSD
Ishak Metry	Director of Central Planning Division
Abou El Elah Mohamed El Sayed	Head of Operations & Maintenance Division
Said Ayyed	General Director of Financial Affairs
Samir Badr El Din	General Director of Mechanical & Electrical Division
Abdel Aziz El Malatawy	General Director of Accounts
Abdellah Ashmawy	Director of Public Relations
Ismail Metwalli	Deputy of Budget Administration
Lulu Salama Khalil	Director of Information Center
Mohamed Ismail	Head of Inspection Division
Abdel Nasser Abdel Fattah	General Director of the Western Region.
Hamdy Hassan Massoud	General Director of the North Cairo Region
Hamed Waly	Director of South Giza Region
Salah El Din Taha Mahmoud	General Supervisor of the Mid Zone Stations
Abdel Kader Hamdy	General Supervisor of the Helwan Region
Ahmed El Kot	Director of Souk El Samak Pumping Station
Mahmoud Ismail	Director of Ameria Pumping Station
Mohamed Abdel Fattah	General Director of the Vehicle Repair Shop
Mohamed Khattab	Head of Mechanical Sewer Cleaning Division
Ramadan EL Saghir Mohamed	Head of the Submersible Pumps Workshop
Amira Ibrahim Hussein	Lab Supervisor /Chemist Heliopolis
Milad Ibrahim Yacoub	Training Coordinator
Tharwat Mohamed Mostafa	Treatment Stations Engineer (Work Order IYA)
Mohamed Sayed Saleh	Engineer /Supervisor of the Syphon Pumping Station
Samy Youssef	Engineer Ejector Stations
Samia Samy Selim	Civil Engineer (Work Order IYA)
Mohamed Gamal Ishak	Mechanical Maintenance Engineer