

DANIDA
**Air Quality
Monitoring Programme**
Mission 5 Report



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DANIDA;
Air Quality Monitoring
Programme
Mission 5 Report

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1 Introduction

The fifth mission to Egypt was undertaken in April- May 1997 to update the monitoring programme to finalize the discussions concerning the Monitoring Laboratory and to start the air quality monitoring programme. The work was based upon the plans for the second phase of the Environmental Information and Monitoring Programme (EIMP) for the Arab Republic of Egypt, for which NILU is responsible for the development of an air pollution monitoring system.

The project is funded by Danida. The project leader is Jan Hassing from COWI in Copenhagen. VKI (the Danish Water Quality Institute) and COWI are responsible for coastal water monitoring, NILU is responsible for air pollution monitoring, VKI is responsible for the Reference Laboratory and COWI is responsible for pollution sources and emissions.

The visit in April- May 1997 included more siting studies. Some of the sites selected in 1996 had to be changed due to the change of Air Quality Monitoring institution. Also new additional sites were selected, visited and described. The objectives of this visit included the following tasks referring to the work programme activities:

- A.1.2. Finalize job descriptions for Air Quality Monitoring Laboratory (AQML) personnel, and support the development of contracts,
- B.2.1. and B.2.2. Select representative monitoring sites for A.Q. measurements adding to previous selected, improve the quality of sites selected in Cairo and Alexandria, and define site characteristics.
- C.1.3. Discuss and assist in supporting equipment and tasks for the Reference Laboratory; air pollution part.
- C.2.2. Prepare instruments for installation.
- E.2.1. Prepare training programmes.
- F.1.1. Appoint QA officer and other new experts for the AQML
- G.2.2. Prepare monitoring programme procedures
- G.3.1. Prepare for the first installation in field, establish calibration programme at Reference Laboratory.

Some of the persons we met are presented in Appendix A.

2 Meeting 6 April 1997

2.1 Present status concerning laboratories

An introductory meeting with Ulla Lund, Sherif Hassan and Mohammed Nasar was arranged on 6 April to summarize the situation concerning the selection of the Reference Laboratories (Air and Water) and the Air Quality Monitoring Laboratory (AQML).

Following a long story of alternative solutions, economic problems, budget estimates and political decisions, we concluded that the first priority solution considering the present choices would include that

- the Reference Laboratory and the Monitoring Laboratory should both be located in Cairo,
- the Reference Laboratory should be the more experienced.

From an air pollution monitoring programme point of view we would select as first priority the Environmental Hazard Mitigation Institute (EHMI) at Cairo University to be the Monitoring Laboratory assuming that National Research Laboratory (NRC) represented by professor Nasrallah could host the Reference Laboratory for air pollution. It would further not be necessary that the Air Reference Laboratory and the Water Reference Laboratory were located at the same institution.

In the summaries from the Steering Committee Meeting no.4 on 3 April 1997 (Appendix B), it is stated that the Reference Laboratory Lab water will be established at Ain Shams University, Reference Laboratory Lab air at NRC. Further the air pollution monitoring capabilities will be established at Cairo University with Alexandria University (Institute for Graduate Studies and Research, IGSR) as sub-contractor.

2.2 The Reference Laboratory, Air Pollution

In a brief meeting with professor Nasrallah it was made clear that he on behalf of NRC was interested in and willing to take the responsibility for the Reference Laboratory for air pollution.

Some budget estimates had been presented and discussed. However, it was stated by Dr Nasrallah that he would be willing to come down on previous estimates. He further stated that the final price was not decisive.

He was also clear on the argument that the EIMP programme's intention was not to establish a new institution, but to use the present infrastructure, add the necessary additional expertise and undertake the tasks necessary to meet the requirements of a Reference Laboratory.

3 Site visits

Bjarne Sivertsen together with Dr. Nasar prepared the first time schedule for site visits in the greater Cairo area. The following time schedule were agreed:

- 7 April: Maadi Police station and Tabbin Institute (new site)
- 8 April: Meeting with Cairo University
- 9 April: Shoubra El Kheima and Embaba Police station
- 10 April: Azbakheya (ElGemhoroya street), Attaba and Tahrir square
- 14 April: Nasr City (new site), Ain Shams University (new site)
- 21 April: Sites in the Delta (Kafr El Zayet and Damhanhur)
- 22 April: Alexandria , meeting with Dr ElRaey
- 23 April: Site visits in Alexandria
- 24 April: Alexandria and Delta sites.
- 30 April: 10 Ramadan
- 5 May: 6 October city
- 11 May: Suez
- 11 May: Ismailia
- 12 May: Port Said
- 13 May: Damyat
- 13 May: Zagazig
- 15 May: El Fayum
- 19 May: Sharm ElSheik, Ras Mohammed
- 25 May: El Minya
- Sept/Oct: Assyut, Hurghada, Upper Egypt (Luxor etc.)

Many sites were selected in the first phase of the project, but had to be changed due to change of monitoring institutions. Siting reports have been prepared for all sites. These reports are presented in Appendix C.

4 Cairo University as Monitoring Laboratory

4.1 Visit to Cairo University

A visit was paid to Cairo University, Environmental Hazard Mitigation Centre (EHMC). The following persons participated in the discussions: Dr Tarek Mohamed El Arabi (Vice director of information and data analyses), Ashraf El Mashraby, Mrs. Amani Taher, Zenab and Noha. Dr. Hesham (data expert) was out of office, but will in the future be the administrative representative.

The Centre will in the very near future move to the new chemistry building. It was stressed that the centre would have to be considered a consultant part of the University, and that they were used to carry out projects on contracts.

Their experience in air pollution studies was related to a study of lead in the Cairo air reported in 1996. Samples were collected with Andersen and Sierra Dichro samplers. Four filters were collected at each of 12 sites in Cairo. All filters were analysed at Washington State University, USA.

EHMC is planning to install a complete air quality monitoring station at the University dormitory. Monitors for SO₂, NO_x, ozone, and meteorology is already arrived. The delivery also contains a multigas calibration unit. The instruments will be installed before the summer 1997.

The new Chemical laboratory is located at the third floor in a new building not finished yet. However, Tarek believed that all chemical lab. equipment and the installations will be finished within the next two months.

Very limited space was available for the EIMP/EEAA Air Quality Monitoring Laboratory (AQML). One storage room (5.5×2.5 m) could be used for monitor maintenance, repair and calibrations. Three persons will have to be located in this room. An office for the AQML Programme Manager was not available.

However, the Dean of the faculty Dr Sharkawi, who we briefly met to discuss the tasks of the AQML, promised to see that adequate space would be made available. Concerning computer data retrieval and data handling this would be part of the computer room. The wet chemistry laboratory seemed adequate to take care of all the chemical analyses of samples collected in the air quality

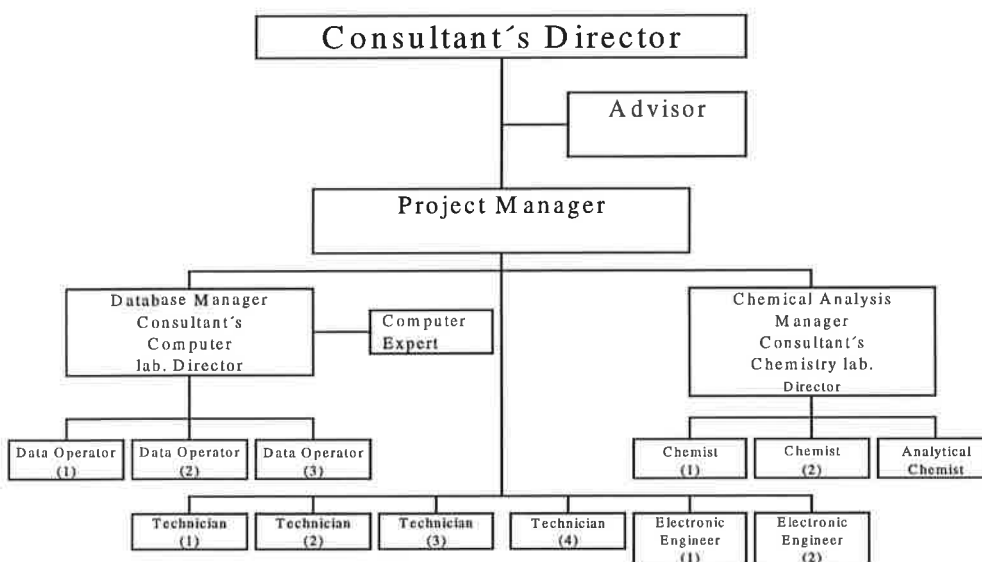
sampling programme, included filters from high volume samples. For further information about the EHMC see Appendix K of the Mission Report no. 4.

4.2 Draft contract

A draft contract for the Monitoring Laboratory was discussed in a meeting with Dr Tarek El Arabi on 13 April 1997.

The main objectives of the discussions were to specify personnel needs, laboratory capabilities and office space needs. Also some feed back on monitoring field inspections, travels and support personnel (technicians and engineers) were included in the discussions.

As a result of the discussions the following Monitoring Laboratory organisational chart was developed:



Seven new experts will have to be employed to complete the team. The University will issue advertisements for these new positions.

4.3 Discussions and modifications

In a meeting with Tarek ElArabi on 4 May 1997 the draft contract was discussed. The organisational chart had been changed. EHMC had introduced a Quality Assurance Group of 3 persons, a Database Manager (Hesham ElArabi), an Air Quality Station Manager (to be appointed) and a Chemical Analysis Manager (the new director of the Chemical Lab. not appointed yet).

After discussions we agreed upon one computer expert heading 3 part time data experts, one electronic engineer, a physical engineer with 4 technicians (the latter 6 persons to be appointed). For chemical analyses two analytical chemists

and one chemist will take care of all sampling data. Altogether 17 persons were mentioned in the organisation chart.

This staff should be appointed before 1 June 1997. Advertisements would have to be placed to find these experts. Also a budget proposal was discussed and modified.

It was agreed that the team at Cairo University would service all the stations in the greater Cairo area as well as in the Delta and in the lower part of upper Egypt. This is one reason that as many as 4 technicians (for weekly calibration and sample collection) were accepted.

A final Draft Contract was discussed at the University on 26 May 1997. The Contract was delivered to the Dean of the Faculty, and comments were anticipated within a week.

Leif Marsteen, who arrived in Cairo on 21 May 1997, inspected the facilities at the University, and confirmed that the space for the Monitoring Laboratory was too small. More space should be made available for this Programme from the Cairo University. Further discussions concerning office and laboratory space have to follow.

5 Shelters

A standardised shelter developed and built by Dr El Soueni at Chemical Technical Service for Kontram Company was visited in Maadi. The shelter seems to be constructed based on US standards. However, it is large and heavy (more than one tonne). For many of the sites it would have to be lifted to the roof of buildings. It had been decided not to order any of these shelters presently.

EEAA on behalf of Dr. Salah Hafez also received a letter from Arab Contractors, offering to house air quality monitoring sites at their buildings across Egypt. They also are willing to construct shelters if needed. This will be undertaken free of charge at the Arab Contractors sites.

We have designed a typical shelter that could be used for the monitoring programme (see Appendix D). The dimensions and weight are smaller than the ElSoueni shelter. It will also be considerably less expensive. Air conditioning systems can be installed if needed. Benches, air intake etc. are also included.

The prototype shelter, which was visited in Maadi, could be made available to the EIMP Programme at material costs. It was indicated by Mr ElSoueini that about 12 000 EL was a lower limit for giving over this shelter to EIMP. We will consider the possible use of this shelter as part of our Programme.

6 Work programme re-organized

In a meeting between Mogens Heering, Jan Hassing and the team leaders it was indicated that the work programme should be revised to meet continuity and more satisfaction from our counterparts.

The objectives will not be changed, but the implementation could be modified.

The programme is now seen as undertaken in 2 phases:

1. The development phase (presently undertaken).
2. An operational phase (in which our counterparts take more responsibility).

In the operational phase it is desired to establish a twinning arrangement between expert institutions (NILU; VKK etc.) and similar institutions in Egypt. This institutional co-operation has to be established with the selected monitoring institutions in Egypt.

The work undertaken by international experts should be based on longer periods of presence in Egypt. This is naturally dependent upon the money available. However, it was stated that for the air pollution monitoring component this is well taken care of. Leif Marsteen will overlap B Sivertsen one week in May, and then continuously stay in Egypt (except for holidays) till a major part of the monitoring programme is established. When he leaves in 1998 the monitoring Institution together with our counterpart should be able to take over with intermittent expert visits (exchange of experience).

An updated time schedule for 1997 and a rough first estimate of 1998 activities are presented in Appendix E. Also the status as of March 1997 can be found in Appendix E.

7 AirQUIS for EEAA

The discussion whether the NILU developed AirQUIS system should be established as the database for the emission inventory component has been discussed at several occasions. The establishment of AirQUIS at EEAA will also support the use of this database for the ambient air quality data.

A draft proposal was developed by NILU on 1 April 1997. The integrated GIS user interface in AirQUIS will enhance the user friendliness of the system, as well as reporting possibilities. It was proposed that the AirQUIS version installed for EIMP/EEAA should include the following modules:

- ◆ Manual data entering application,
- ◆ data base for storing measured data,
- ◆ data base for storing emission inventories for point sources,
- ◆ emission models,
- ◆ user interface including integrated GIS.

The proposal included the installation of AirQUIS on one computer. This may function as an application server, with possibility for client installations in the EEAA internet.

Other data bases have also been considered for EEAA. The European developed Corinair emission data base is a comprehensive tool for developing annual emission inventories. It uses specially designed methods, it will require comprehensive training from experts, it will create an emission database with reference to one specific year and it is not linked to graphical/GIS output.

A World Bank data base for industrial pollution was also considered. This data base seems to be developed for regional studies based on country-wise consumption numbers. Both these data bases seem to be less adequate for the EEAA application than AirQUIS. It was on these bases decided that AirQUIS will be the data base to be applied for EEAA.

Further information concerning the AirQUIS draft project proposal and the manpower and time schedules discussed in April 1997 is presented in Appendix F.

8 The Air quality monitoring programme for Egypt

A complete air quality monitoring programme for Egypt was designed based upon the number of various instruments purchased within the budget available from Danida.

The programme has taken into account that instruments located far away from the Monitoring institutions have to be visited and serviced at least once a week. We have thus tried to use on-line monitors at distant locations, so that quality controls can be undertaken daily via telephone connections.

As far as possible we have also defined typical monitoring sites and typical sampling sites, so that the same technician/engineer can handle the site visit, calibrations, collection of samples and repairs. The programme as outlined in April 1997 is presented in Appendix G.

The Cairo measurement network consists of 11 sites, with a balanced mix of monitors and samplers. There are also assigned 3 on-line weather stations to the network in Cairo; one located in the north east, one in the west and one south of Cairo.

Sites have also been selected in the outskirts of Cairo; in 10 Ramadan and in 6 October city. These residential/industrial areas will be equipped with samplers and will not require telephone connections.

Seven sites have been selected for Alexandria. Only four of these will be fully equipped in the first phase of the project. Intermittent measurements and short term samples will be collected at the sites where monitors are not installed. Also one meteorological site has been selected for Alexandria.

Another 20 sites have been selected in the Delta and in upper Egypt. Background stations were selected for ozone measurements in Sharm ElSheik and Hurghada. A total of 40 sites are thus made available for air quality measurements in Egypt. Automatic monitoring will be undertaken at about 25 of these sites. Various types of samplers will be used at some of the sites, and in some areas only passive or other simple sampling equipment will be applied at selected time periods. These data will thus give EEAA a complete picture of the air quality situation in Egypt.

When the telephone lines have been made available the automatic monitoring data will be transferred daily via modems and telephone connections to the Monitoring Laboratory in Cairo. In other cases the data will be collected on floppy diskettes and brought to the Monitoring Laboratory weekly for retrieval and quality control. Also samples from the sampling stations will be collected every week and brought to the Monitoring Laboratory for analyses.

8.1 The greater Cairo area monitoring programme

Based upon the site visits undertaken in 1996, and further site visits in April-May 1997, the following Table summarises the air quality monitoring programme for Cairo.

Air quality measurement sites in greater Cairo

Name	Area type	UTM co-ordinates		Parameters	Instruments
		X	Y		
El Gemhoroya street	Street canyon	330,	3326,	NO _x , CO, PM ₁₀ , NMHC	gas monitors, PM ₁₀ monitor
Ain Shams University	Urban / Residential	334,7	3328,9	NO _x , SO ₂ , TSP, meteorology	gas monitors, high vol., AWS
Embaba police station	Road side	328,	3328,5	NO _x , CO, NMHC, PM ₁₀	gas monitors, PM ₁₀ monitor
Tahrir square	Urban centre	329,3	3325,3	NO _x , SO ₂ , O ₃ , NMHC, TSP, PM ₁₀	gas monitors, high vol.
Nasr City	Residential	338,2	3325,9	NO _x , SO ₂	gas monitors,
Shoubra el Kheima.	Industrial	333,2	3332,5	SO ₂ , NO _x , PM ₁₀ /TSP, dust fall,	gas monitors, high vol., bucket
Maadi (police station)	Residential	332,2	3315,3	SO ₂ , NO _x , PM ₁₀ , dust fall	gas- and PM ₁₀ -monitors, bucket
Tabbin	Industrial	335,2	3295,3	SO ₂ , PM ₁₀ , TSP, dust fall, meteorology	gas- and PM ₁₀ -monitors, high vol., bucket, AWS
Tabbin South	Industrial	336	3291	SO ₂ , PM ₁₀ , PAH?	samplers
Giza, Cairo University.	Residential	326,	3323,	SO ₂ , NO _x , O ₃ ++	gas monitors
Giza pyramid	Regional impact	319,9	3317,5	SO ₂ , NO ₂ , BS/TSP	sequential samplers

A total of 11 sites have been selected in Cairo including monitors, sequential samplers, high volume samplers, meteorology and dust fall collectors.

8.2 Air quality measurement sites in Alexandria

A total of 6 sites is being proposed for continuous monitors and samplers .A summary of these measurements is presented below.

Air quality measurement sites in Alexandria

Name	Area type	UTM co-ordinates		Parameters	Instruments
		X	Y		
Abu Quir College	Industrial	529,4	953,1	SO ₂ , NO _x , PM ₁₀ , NMHC	gas monitors, PM ₁₀ monitor
El-Max Petrogas	Industrial	504,8	937,5	NO _x , SO ₂ , TSP, NMHC	gas monitors, high vol.
IGSR, Alexand. University	Urban, Road side	511,60	944,1	NO _x , CO, NMHC, SO ₂ , PM ₁₀ , meteorology	gas- and PM ₁₀ monitors, AWS
El-Azafra-El Azhar Univers.	Residential	520,4	951,1	SO ₂ , PM ₁₀	monitors
Gheat El-Enab school	Residential	510,0	941,5	SO ₂ , NO _x , PM ₁₀	monitors
NIOF	Outside city			Ozone	monitor

8.3 Monitoring Sites in the Delta

Some of the larger centres and industrial areas in the Nile Delta have been selected for the air pollution monitoring programme.

ElMansurah is the capital of Daqahliyah Governorate, on the Damietta branch of the Nile River. It is a commercial and manufacturing centre; products include textiles and processed food. Al-Mansurah University (1972) and al-Mansurah Polytechnic Institute (1957) are here. In Talkha, on the northern side of the river Nile, are several industries included fertiliser factories. These are located upwind from Mansurah and will cause pollution in the city centre here. The population of Mansurah is estimated at about 362,000 (1991).

ElMahallah Al-Kubra is one of the leading textile-manufacturing centres of the country. The city has cotton-processing plants and spinning mills. The estimated population of ElMahalla is 400,000 (1991).

Tanta is the capital of Gharbiyah Governorate. It is an important railroad junction and is situated on a major Cairo-Alexandria highway. Manufactures include textiles, processed food, and tobacco products. Tanta University (1972) are in the city. The population is estimated at about 373,500 (1986).

Kafr ElZaiyat is located on both sides of the river Nile (western branch). Heavy industry such as chemical (pesticides), textile, petroleum etc. is located in the northern part of the city. More than one hundred stacks at brick factories

in the western and southern part has been identified. These emits black smoke, sulphur and particles.

Damietta (Arab. Dumyat) is the capital of Damietta Governorate. The principal exports are furnitures, fish, fruit, and rice. The chief manufactured products are cotton textiles, a variety of which, known as dimity, from the name of the city, originated here. The city has about 50 000 small workshops for furnitures, shoe, painting and food products. The population has been estimated at about 125 000 (1986), the larger city area it was indicated 350 000 inhabitants.

8.4 Monitoring sites in Canal Area

Some sites have been selected for air quality monitoring in the Suez Canal area. Not all of these sites will be equipped with automatic monitors. At some sites we are planning for future sampling of various kind. At some sites the data collection may be based on passive sampling during selected periods. However, it is believed that all these sites will give representative figures for the typical air quality situation in these areas.

For detail descriptions of sites see Appendix C.

Suez is located at the southern entrance of the Suez Canal. The city has about 500 000 inhabitants. Several industries are located in the south western part of the city, such as petrochemical industries, refineries, cement factories, fertiliser industry and a power plant. North of the city centre are smaller industries and brick factories.

Ismailia Governorate consists of an area of about 1441 km². The city is located on the northern shores of Bitter Lakes, which is a part of the Suez Canal. It is a fairly clean city without any large sources of air pollution. The total population (Governorate?) has been estimated to 544 000 (1986) about 300 000 lives in urban areas. One air quality measurement site was selected in the central part of the city.

Port Said is located at the Mediterranean Sea at the northern entrance of the Suez Canal. Several industries are located in the southern part of the city, such as food -, chemical -, and textile industries. The estimated population of Port Said is about 528 000. Some measurements of air pollution have been undertaken by the Ministry of Health Laboratory, indicating TSP concentrations of 50 to 120 µg/m³ (March 1997) and smoke 20 to 60 µg/m³. One site in the city centre and one in the southern industrial area was selected.

Other measurement sites may also be used in the future, both in the Canal area and in the Delta. Urban areas such as Zagazig, Tanta, Ismailia and Port Said may be investigated using simple sampling equipment over selected limited periods. Analysis of these data will be compared with meteorological data to yield as much information as possible.

8.5 Monitoring Sites in Upper Egypt

Nine sites have been selected in upper Egypt. Only two of these have been visited and described during this mission; ElFayum and ElMinya. The rest of the site visits are assigned for the mission in October 1997. Measurements will by any mean start at these sites until after medio 1998.

8.6 Background stations

Two sites have been selected for background measurements. Most important at these sites are the measurement of tropospheric ozone, which may express the potential for NO₂ formation in urban areas and cities.

The main background station for ozone in the Sinai area will be located at the EEAA laboratory in Ras Mohammed National Park. In Sharm ElSheik we will also include simple measurements of SO₂ and NO₂ using passive sampling during selected periods. In the future we may select to measure for background air quality in Hurghada. Ozone may be one parameter, but also other integrated sampling values may be collected.

9 Training Programme

Training is an essential part of the establishment, installation and operations of the air quality monitoring programme. An important part of the training programme will be based upon on-the-job training. It is essential that the personnel at the Monitoring Laboratory, who will have the responsibility for the future monitoring system, is appointed and aware of their tasks and responsibilities before this training starts. Training includes all parts of the Air Quality Monitoring Programme; The Task Manager (Counterpart), the Monitoring Laboratory staff and the Reference Laboratory staff. Some of this training was discussed and prepared as presented in Appendix H.

9.1 Task Manager (Counterpart) Training Programme

An important part of the Air Pollution Monitoring Programme will be to establish a clear understanding of the necessary daily follow up and quality control which all data collected will have to undergo. One key person in the establishment of the monitoring sites, the development of network and supporting the initiation phase of this programme will be the Task Manager Counterpart Dr Mohammed Nasar.

As an important part of his training programme we have included a visit to the Norwegian Institute for Air Research (NILU) at Kjeller, Norway. The purpose of this visit will be to :

- ♦ be introduced to the air pollution work undertaken at NILU,
- ♦ participate in a typical days work at NILU,
- ♦ visit monitoring sites,
- ♦ discuss quality assurance and quality control with responsible key personnel,
- ♦ study sample preparation and analyses,
- ♦ discuss laboratory procedures and controls.

A visit to the Norwegian Pollution Control Authorities will also be part of the programme.

The visit has been planned to take place from Monday 4 August and will be terminated on Friday 15 August 1997.

9.2 Training of Monitoring Personnel

These experts will have to participate in training from the beginning of the installation and calibration of monitors. This training will take part both at the Reference Laboratory and at the Monitoring Laboratory. Background will be given for the site selection procedures and some selected experts will have to participate in the in the field establishment of instruments.

An on-the-job training programme will also be undertaken for daily instrument checks, calibration and maintenance. Training will be conducted at the Monitoring Laboratory after a similar introduction has been undertaken for selected experts at the Reference Laboratory. Similar training will also be performed for selected experts from the sub-contracted monitoring institutions. This training will take place with installed instruments in Cairo, and be continued at the main monitoring site in Alexandria.

Concerning the sampling equipment included in the programme, training in chemical analyses and use of laboratory equipment was originally assumed to be given by experts at the Reference Laboratory to personnel at the Monitoring Laboratory. Local experts for specific instruments such as Atomic Absorption Spectrometer and Ion Chromatography may be used for special training courses.

9.3 Air Pollution Monitoring Seminar

A introductory seminar has been prepared for the EIMP air pollution monitoring staff. This seminar will be held at the beginning of the measurement phase, (October 1997?) and will give an introduction to modern air pollution monitoring and information systems. As many as possible of the personnel that will be involved in the EIMP air pollution monitoring programme will have to attend this 3-4 day seminar.

This apply to the Monitoring Laboratory personnel, to the monitoring institution's personnel, to selected Reference Laboratory experts and to key personnel at the EEAA, who in the final Phase will receive the data for further application.

10 Quality Assurance Procedures

For a QA/QC system to function, its use must be supervised and procedures continuously adjusted to needs and changing conditions within the monitoring institution.

A QA/QC manager or supervisor must therefore be appointed. The responsible air quality sampling and monitoring (programme) manager will have to work in close co-operation with this person. It could ideally be the same person.

A prerequisite for the successful functioning of the QA/QC supervisor, however, is the commitment by the management of the institution to provide sufficient time and resources for the laboratory staff to do QA/QC work.

The Reference Laboratory and the air pollution advisers will assist in defining the role of a QA/QC supervisor. The Reference Laboratory will organise workshops in QA/QC for both management staff and laboratory staff. It will also perform assessment (audit) of sampling and monitoring activities and related quality assurance of the Monitoring Laboratory, as described in Appendix I.

11 Agreement with Air Quality Monitoring Laboratory

Several meetings were held between the EIMP Air Pollution Monitoring experts and Cairo University EMHC personnel, represented by Dr Tarek ElArabi, to prepare and finalise a contract between EEAA/EIMP and the Monitoring Laboratory at Cairo University.

Major issues such as the content of the Main Contract, Annual budget estimates, task and duties, personnel and organisation and advertising positions for new experts were important parts of the discussions. A final draft contract was finalised on 27 May and delivered to Cairo University for comments. The Appendix to the Draft Contract is presented in Appendix J.

12 Staff Meeting

An EIMP staff meeting was held on 25 May 1997. The same day we had organised a site visit to ElMiniya. The Air Pollution Monitoring Programme was thus reported through a memo delivered to Jan Hassing.

The content of the memo is referred below:

The EIMP Air Quality Monitoring Programme is being prepared and developed according to plans. However, it is behind original time schedules due to change of institutions, instrument delivery delays and length of contract negotiations.

The following status can be reported as of the Staff Meeting of 25 May 1997.

Site studies

Measurement sites in Cairo, Alexandria, the Delta, the Canal area and in Sinai has been visited and described. Sites that had been decided in Cairo and Alexandria in 1996 had to be cancelled. The new sites will meet all criteria defined in the first phase of the project.

Site representativity has been discussed, detailed locations were pointed out and measurement parameters have been decided. A total of 40 measurement sites covering the whole of Egypt have been selected (see Appendix Table). The sites in Upper Egypt still remains to be visited and described.

Monitoring Laboratory Contract

Cairo University Environmental Hazard Mitigation Centre (EHMC) has been selected to be the EIMP Air Quality Monitoring Laboratory. Several meetings have been held to discuss and finalise an Agreement/Contract for undertaking the work. The representative from EHMC in these discussions has been Tarek Mohamed El Arabi (Vice director of information and data analyses).

The Centre is presently moving into the new Chemistry building. It has been stressed that the centre has to be considered a consultant part of the University, and that they were used to carry out projects on contracts.

A new version of the Draft Main Contract will be delivered to the University on 26 May 1997. Changes have been implemented according to previous discussions. The Appendixes are being finalised, and have been discussed in depth. Also a budget estimate has been delivered by the University and included in the Contract Appendix.

Instrument deliveries and installation

All instruments and equipment ordered have been divided into 3 deliveries. The first set of instruments; weather stations and particle samplers have arrived in Cairo, but have not been released from customs.

Instruments to be used at the measurement site in Giza (at Cairo university) is already in Cairo. These instruments were delivered to the University, and are of exactly the same type as ordered by the EIMP programme.

The plan is thus to start installing the first monitoring site at the Cairo University. This site will represent a complete monitoring set including monitors, data acquisition, calibrator, computers, quality assurance programmes and data presentation routines. Preparations and installation will begin as soon as the Contract has been signed. This site will also include a weather station and will act as a perfect set up for training.

Further installations will follow when the first delivery of monitors have arrived at the storage in Tabbin. The sequence of installation as presently planned will be: 1) The Monitoring Laboratory, 2) The Reference Laboratory (if prepared and available), 3) Tabbin Institute (monitoring room already prepared and ready to be used), 4) Shoubra ElKheima.

Training

The training of experts will start as soon as the first monitors have been installed. On-the-job-training will be undertaken at the Cairo University. Further training for the new EMHC experts will continue in the Monitoring Laboratory, and continue at the first two sites.

In October a one week seminar on air pollution monitoring and surveillance will be given. The compendium has been prepared and will be part of the written material.

13 References

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- Sivertsen, B. (1996) DANIDA Air Quality Monitoring Programme. Mission 2 Report. Kjeller (NILU OR 39/96).
- Sivertsen, B. and Marsteen, L. (1996) DANIDA Air Quality Monitoring Programme. Mission 3 Report. Kjeller (NILU OR 62/96).
- Sivertsen, B. DANIDA Air Quality Monitoring Programme. Mission 4 Report. Kjeller (NILU OR 4/97).

Appendix A

People we met

Names and addresses in Egypt (EIMP)

Office:EIMP,3 EEAA Building, 30 Helwan Str.
 Maadi, Cairo (behind Sofitel hotel) ,
 Tel. 202 378 5137, Fax: 202 378 5478

Staff: Dr Mohammed Nasar (AQ) , tel 351 5174
 Mohammed Fathi,(PM), Anwar Ahmed (proc),
 Sherine Khaliw (coast w), Sherif Hassan (reflab),
 Gihane Bayoummiem (emiss), Mohammed Zaki (EDB)
 Dina, Lydia, Hassan, Mahmoud, Emad, Samir,
 Email: jhassing@powermail.intouch.com
 eimp@intouch.com

Hassing private: tel: 202 340 5741
 D Clarke, 23 road 84, Apt 62, Maadi.
 Ulla Lund, Arne Jensen, Jacob Andersen
EEAA,Dr. Salah Hafez (Chairman)
 Dr. Mohamed el Zarka (Jan's counterpart)
 Dr. Abdil Latif Hafez (Air Quality respons.)
 Ms Heba Mohammed Adly, (Env. researcher).
 Mrs Hoda Hanaffi (head of GIS), Mr Mohib?
 Omar Hussein (GIS)

Cairo University, CEHM (c. env. haz. mitig.)

Dr Sharkawi, Dr Tarek El Arabi, Dr Sultan

TIMS, Tabbin- Helwan (tel:5010170)

Prof. Saaid, and dr. Hassan Hamad

Prof. Saied El Khalil

NRC; Shari el Tahrir, Dokki Square,

Dr Nabir Saleh (dir)

prof., M. Nasrallah, tel 3537299, Fax 3370931

Institute of Graduate Studies and Research

Univ of Alexandria, Prof M El-Raey, tel:422 7688 ,

Fax 203 421 5792, Dr. Sai Shallaby, Ashraf A Zahra.

Ain Shams Univ; Dr Saad Hassan

JICA Minilabs.Dr Mawaheb Abov el Azm

Atomic Energy Authority

Dr Hisham Fouad Aly, 101 Kasr el Eini str.

Dr Mokhtar Hamza (rad.network)

tel: 274 0236 fax: 274 0238

Env.Mon. Centre, EMBABA, Dr. Seham M.H. Hendy

tel: 311 8978, Mr. M.J Refaye, tel: 311 9691

Met. Inst: Salah Abdil Hamid

High Institute of Public Health, Univ. Alexandria

Dr Kamel Noer, Ms. Marvet Amin (models) Fax: 421 5792

President hotel. 22 Taha Hussein street

Zamalek, tel. 202 3400718, fax: 202 34 11 752

Sofitel Hotel: Maadi

Tel: 202 350 6092, Fax: 202 350 6209

Ambassador:

Norge: Al Gazira al Wusta str.

Ambassador: Mette Ravn

tel.340 3340 , fax: 342 0709

Danmark: 12 hassan Sabri, Zamalek

Kirsten Rasmussen 378 2040

COWI: 00 45 45 97 22 11

ROYAL NORWEGIAN EMBASSY
 8 EL GEZIRA STREET
 ZAMALEK
 CAIRO

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Carl Bro
 International a/s 

ENVIRONMENTAL EDUCATION AND TRAINING PROGRAMME
 (EETP)

Egyptian Environmental Affairs Agency
 Cabinet of Ministers

Michael Graham Blackburn

Technical Training Adviser

30 Misi Helwan Agri Road, Maadi

~~28, Teaba Street / 1st Floor, Mohandeseen, Cairo~~

Tel. / Fax (+202) ~~3365418 3364337~~ 3781859

Behind Sofitel



Cairo University

Dr. Tarek Mohamed El-Araby

Ph.D. in Geophysics

Lecturer - Geophysics Department, Faculty of Science
 Vice Director of Information and Data Analysis Laboratory
 Environmental Hazard Mitigation Center

Phone: (202) 571-9687, 571-9688, 567-6797 Fax. (202) 571-7565
 E-mail: tmaear@frcu.cu.eg



CABINET OF MINISTERS
 EGYPTIAN ENVIRONMENTAL
 AFFAIRS AGENCY

OMAR M. HASSAN

Manager



RAS MOHAMED NATIONAL PARK SECTOR

Tabbin Institute for Metallurgical Studies (TIMS)

Prof. S. E. Khalil

DIRECTOR

Tel. & Fax 5010170 - 5010171 E - Mail : tims @ idsc.gov.eg

Dr. Zahi Hawass
Director of the Pyramids
Cairo, Egypt

Phone 011.202.383.3043 Fax 011.202.383.4519

محافظة دمياط
13/5-97
Damietta

رضا الرشيدى
السكرتير العام المساعد
Gen. Secy. Mr. R. EL Rashidi

257 3 24 747
Fax 057 / 324747

مكتب 057 / 320580

S/Sat

Eng.
AHMAD SAMIR ABEDOLLAH
The Sixth Of October City
Authority



Tel. : 011/350409 - 350684
Fax : 011/350404



UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT
MISSION TO PAKISTAN

HARRY G. PROCTOR
CHIEF, OFFICE OF ENGINEERING

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106 Kasr El Aini Street
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E-mail: hproctor@usaid.gov

Government Secy.

16/5

Suez

لواء Mokri in Aij

محسن علي صادق

سكرتير عام محافظة السويس

062.

767890
062 / 331022

Fax. 331084

Appendix B

Steering committee meeting

Environmental Information and Monitoring Programme

Steering Committee Meeting #4

Progress - Institutional support

- counterparts participated in Word and Excel courses
- transfer of EIMP office to Maadi
- presentation of EIMP at Environment 97
- clearing, receipt and storage of equipment
- specs. for coastal water database,
- development agreement with RITSEC

Progress - Coastal Water

- inspection visits to alternative institutions
- requests for unit price quotations
- evaluation of alternatives to NIOF
- preliminary considerations of consequences of working with two institutions instead of one
- contract development incl.. scope of work

Progress - Air Pollution

- inspection visits to potential air pollution monitoring institutions
- requests for unit price quotations
- new site locations in Cairo and Alexandria
- shelter construction
- contract development incl.. scope of work

Point Source - Progress

- Working group meeting and selection of industries
- development and implementation of industrial pollution monitoring seminar
- contract preparation incl.. scope of work
- requests for unit price quotations

Reference Lab. - Progress

- contract preparations incl.. scope of work for air RefLab and water RefLab
- requests for unit price quotations
- inspection visit to alternative institution

Selection procedures

- time has shown that selection of institutions in ProDoc has negative implications for price negotiations
- to counteract negative consequences, either make prequalification, tender and selection (time consuming) or negotiate directly based on control cost estimates

Contract features

- detailed scope of work, monitoring plan, parameters, reporting schedules
- equipment lists, rules for maintenance, agreement to EEAA ownership
- payment schedules based on unit costs and performance, unit costs valid for the programme duration with agreed regulation, revised activity plans each year

Coastal Water Monitoring Institution

- NIOF previously selected
- alternative institutions visited, price quotations received
- most valid alternative (IGSR) studied
- scope of programme and capabilities compared
- division of work between NIOF and IGSR recommended
- technical consequences need further evaluations

Air Pollution Monitoring Inst.

- MOH previously selected was rejected
- Atomic Energy was studied further and found less suitable
- Cairo University or Ain Shams University are possible candidates, none have extensive air quality experience but scientific expertise is available

Point Source Monitoring

- TIMS previously selected
- no institute with matching capabilities has been brought forward

Reference Laboratory

- NRC previously selected
- price quotations from reflag water presently very high and it is doubtful whether further negotiations will bring the price down
- price quotations from reflag air very high but are negotiable
- alternative to Reflab water NRC is Ain Shams University

Recommendations on Institutions Status 3 April 1997

- split coastal water monitoring work between NIOF and IGSR after identification of technically most suitable division
- develop air pollution monitoring capabilities at Cairo University, IGSR subcontracts for Alexandria stations
- finalise negotiations with TIMS
- Reflab water to be established at Ain Shams
- Reflab air to be at NRC if cost efficient

Operational expenses

- operational expenses cover contract costs and cost of replacement of instruments (depreciation) assuming a five year lifetime
- operational cost has a contribution from Danida of 7.5 mill LE and from GOE of 9 mill LE (7.2 mill cash, 1.8 mill in kind)
- options: (a) create equipment fund and pay replacement from this (b) pay replacement directly from budget line when created in Environmental Fund

Appendix C

Site reports

Air quality monitoring network

Site visit report

SiteName: al Gumhuriyyah Street

Co-ordinates: UTM: 333.2, 3332.5

Access/ availability: Near Ramses square, heavy traffic, difficult to park in Gumhuriyyah street.

Buildings and rooms available: Sampler located on a balcony or in an office room on the second floor at the Industrial Gas Company. A small shelter should be constructed on the balcony with access from the room.

Area description: Street canyon in urban area with heavy traffic and high level of activities.

Local sources: Mostly traffic in the general area and around the Ramses square (about 300 m from the site). Heavy traffic on Gumhuriyyah street just under the sampler intake.

Representativity: The site is representative for a street canyon site in central Cairo.

Parameters measured: NO_x, SO₂, NMHC, CO.

Measurement equipment: Monitors linked to telephone lines.

Infrastructure: Power: 220 V available in the room.

Telephone lines: New line has to be installed .

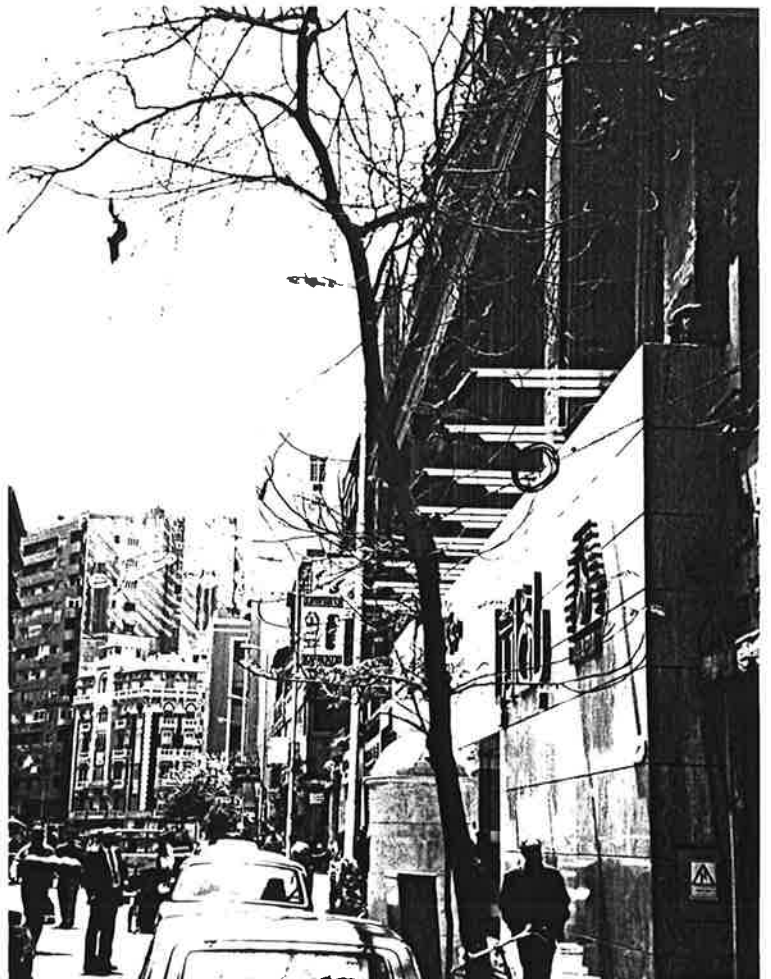
Sampler/monitor locations: On shelf in the shelter.

Air intake: Intake about 1 m from the wall lowered to about 3 m above the street.

Personnel: Local contact Mr Hassan Mohammed (security).

Air quality monitoring network Site visit report

SiteName: al Gumhuriyyah Street
Co-ordinates: UTM: 333.2, 3332.5



Air quality monitoring network Site visit report

SiteName: Ain Shams University

Co-ordinates: UTM: X: 334.7, Y: 3328.9

Access/ availability: Parking at dormitory building B inside main gate from Al-Khalifa ElMamun street.

Buildings and rooms available: On the roof about 12 m above the ground. A small room will be constructed at the top of the stair case.

Area description: Residential, open area, influenced by regional traffic (urban).

Local sources: Traffic on roads south and west from the site. Distance to roads about 100m.

Representativity: The station will be representative for the kilometre scale regional pollution in Cairo north east..

Parameters to be measured: SO₂, NO₂ and meteorology.

Measurement equipment: Sampler for SO₂ and NO₂, and automatic weather station.

Infrastructure: Power: 220 V available in building.

Telephone lines: Has to be taken from outside

Sampler/monitor locations: In a small room constructed at the roof in stair case.

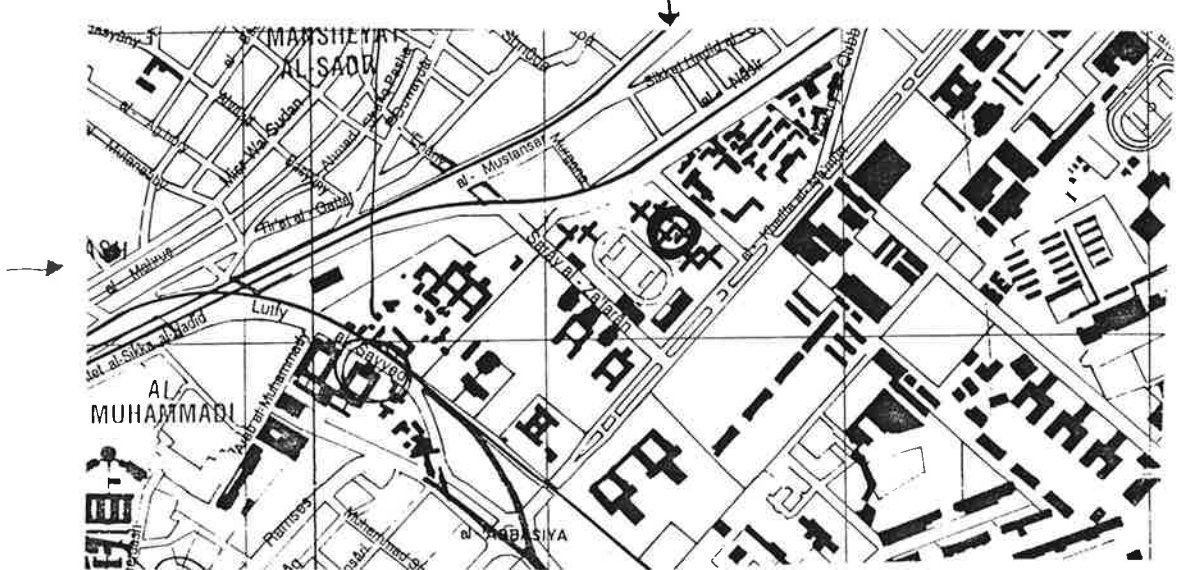
Air intake: About 12 m above ground.

Personnel: Ain Shams will provide construction work. Prepare budget.

Air quality monitoring network

Site visit report

SiteName: Ain Shams University
Co-ordinates: UTM: X: 334.7, Y: 3328.9



Air quality monitoring network

Site visit report

SiteName: Embaba Police Station

Co-ordinates: UTM: 328.2 , 3328.5

Access/ availability: Along the Delta Road 200 m south of Embaba Bridge. Possible to park outside.

Buildings and rooms available: A small shelter will be placed behind the fence facing the road.

Area description: Road/curb side station with heavy traffic up wind from the intake points.

Local sources: Traffic in the general area and on the Delta road. Can also be impacted from emissions from the Shoubra ElKheima area which is located about 6-8 km upwind from the site.

Representativity: The site is representative for a highly trafficked area.

Parameters measured: NO_x, PM₁₀, NMHC, CO.

Measurement equipment: Monitors linked to telephone lines and a PM₁₀ sampler.

Infrastructure: Power: 220 V has to be taken from outside.

Telephone lines: New line has to be installed .

Sampler/monitor locations: In the shelter.

Air intake: Intake about 3 m above the ground 2 m from the road side.

Personnel: Serviced from the Monitoring Laboratory.

Air quality monitoring network Site visit report

SiteName: Embaba Police Station
Co-ordinates: UTM: 328.2 , 3328.5



Embaba police sta.



Air quality monitoring network Site visit report

SiteName: Nasr City

Co-ordinates: UTM: 338.2, 3325.9

Access/ availability: Easily from Al-Sheik Mahmod Shaltut street. Parking on road possible. The building belongs to the district administration.

Buildings and rooms available: A small room (2m×2m) will be constructed on the roof. Details will be discussed with the director.

Area description: Suburban to residential area. Large roads; highly trafficked south and west.

Local sources: Traffic mainly on Al Sheik Mahmod Shaltut and on AllAmin streets. Nasr road. No industrial sources in the area.

Representativity: The site is representative for the suburban areas of Cairo, surrounded by 10 storey buildings to the north and east and roads to the west and south.

Parameters to be measured: SO₂, NO_x, PM₁₀.

Measurement equipment: Monitors automatic.

Infrastructure: Power: 220 V available in the building.

Telephone lines: Will be taken from outside.

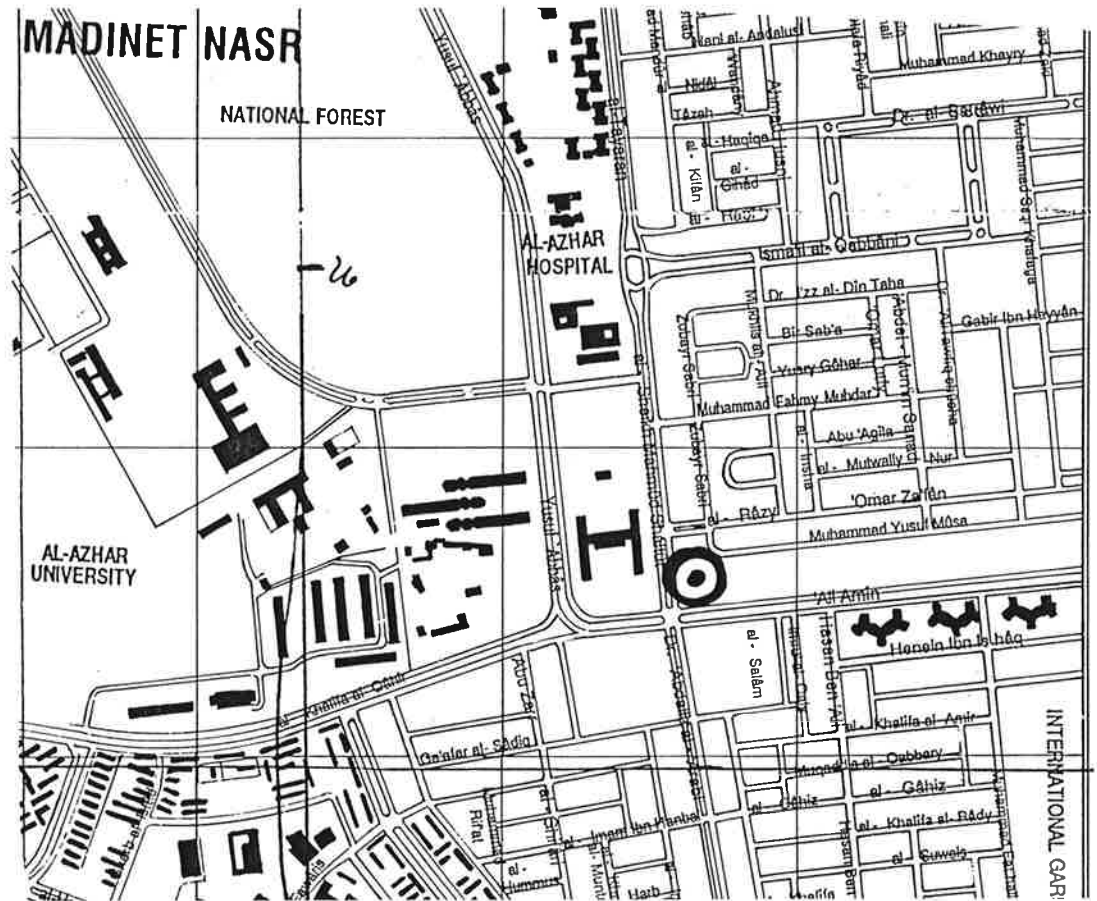
Monitor locations: At roof about 7 m above the ground.

Air intake: About 9 m above ground.

Air quality monitoring network Site visit report

SiteName: Nasr City

Co-ordinates: UTM: 338.2, 3325.9



Air quality monitoring network

Site visit report

SiteName: Shoubra El Kheima

Co-ordinates: UTM: X: 333.2, Y: 3333.5

Access/ availability: Parking outside, gravel road along the north shore of the Ismailia Canal, between several smelters.

Buildings and rooms available: Room in the 4th floor of the Ahmed Shahalan School, on the SE corner of the building

Area description: Highly industrial, very polluted, several small smelters and various industries.

Local sources: Lead smelters to the west, north and east of the school, within a few hundred meters.

Representativity: Very polluted industrial area. Data will show impact of industries on the building.

Parameters to be measured: SO₂, NO_x, PM₁₀, TSP, dustfall

Measurement equipment: Monitors (SO₂, NO_x, PM₁₀), TSP sampler, dust fall collector.

Infrastructure: Power: 220 V available

Telephone lines: Has to be taken from outside?

Sampler/monitor locations: In a small room at 4th floor

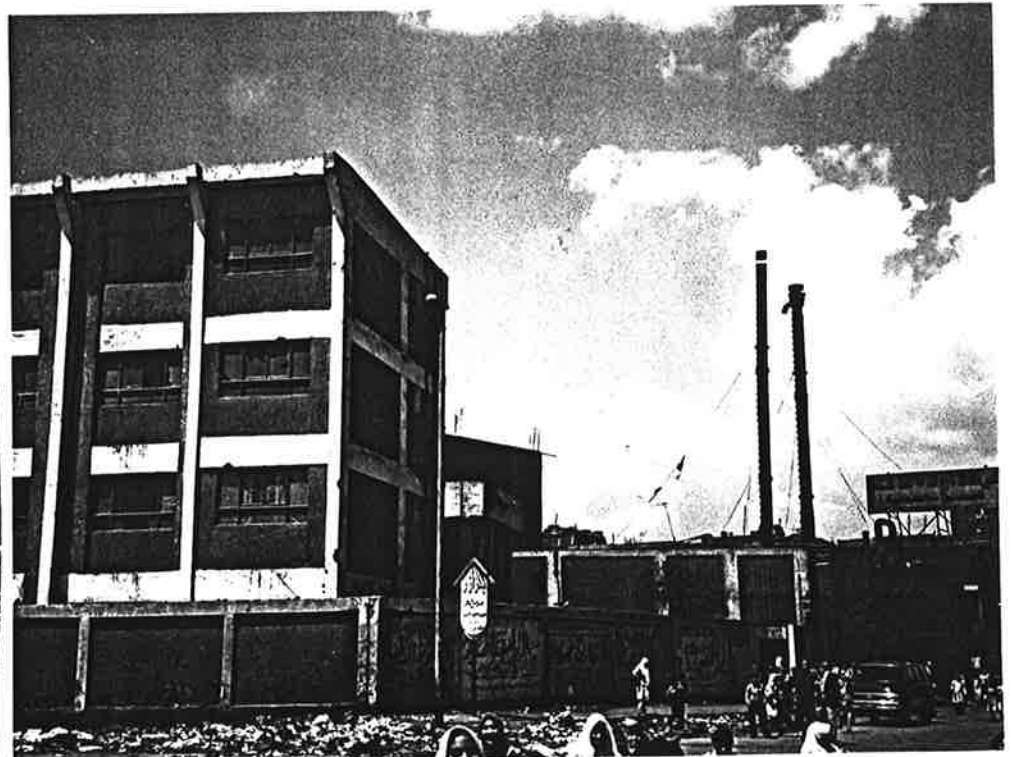
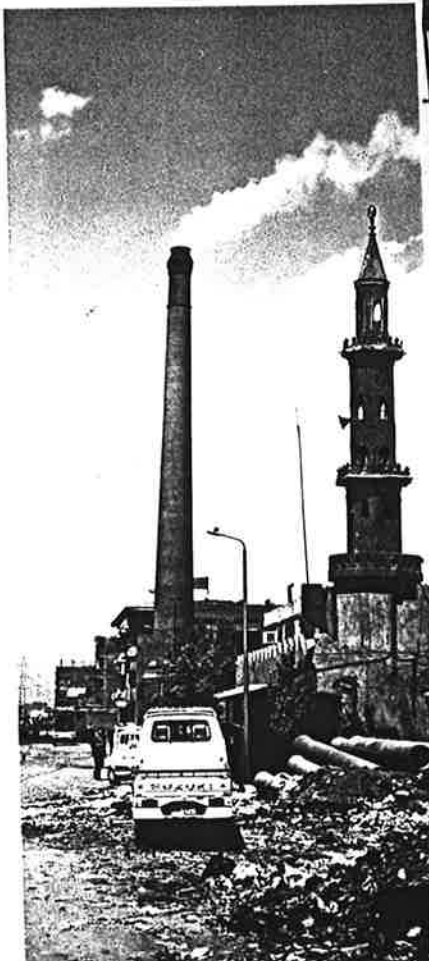
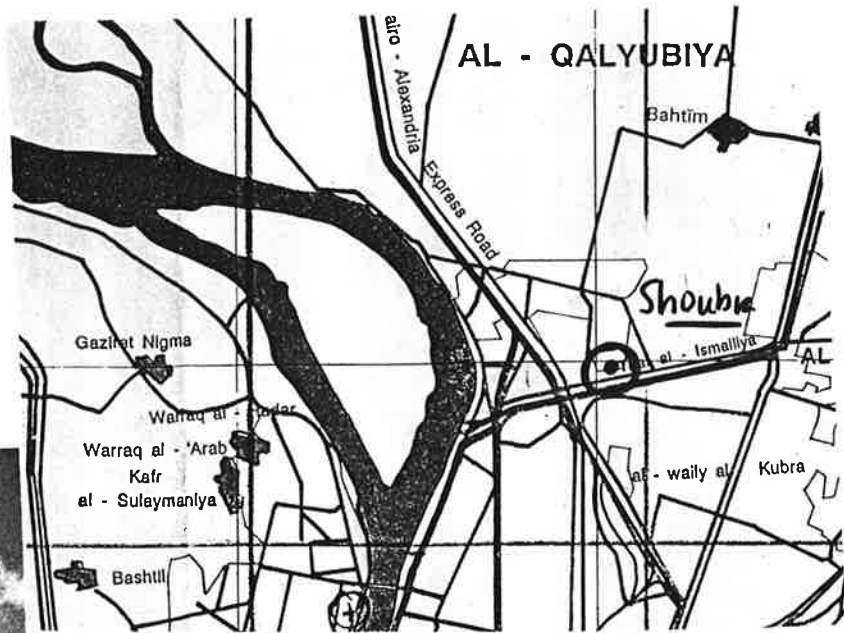
Air intake: about 9 m above ground

Personnel: Mon. Lab.

Air quality monitoring network Site visit report

SiteName: Shoubra El Kheima

Co-ordinates: UTM: X: 333.2, Y: 3333.5



Air quality monitoring network Site visit report

SiteName: Maadi Police station

Co-ordinates: UTM: X: 332.2, Y: 3315.3

Access/ availability: From street via main entrance.

Buildings and rooms available: Shelter on the roof.

Area description: Residential.

Representativity: Typical for Maadi area, near street surrounded by tall trees.

Parameters to be measured: SO₂, NO_x, PM₁₀.

Measurement equipment: Monitors (SO₂, NO_x), sampler PM₁₀.

Infrastructure: Power: 220 V available.

Telephone lines: Has to be taken from outside?

Sampler/monitor locations: At the roof, in specially designed shelter.

Air intake: About 5 m above ground.

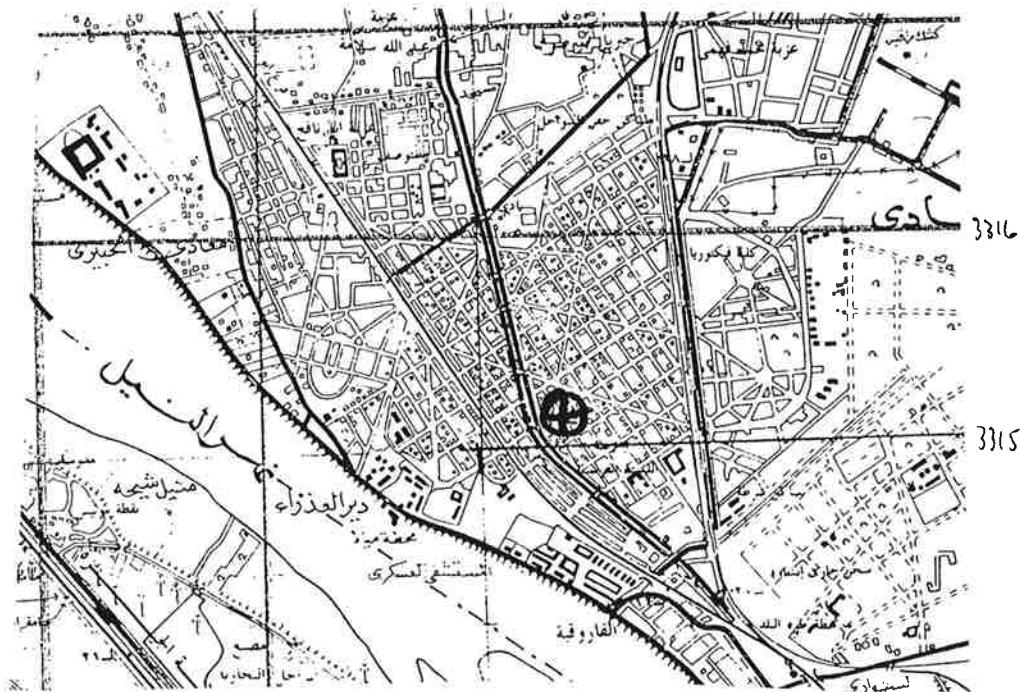
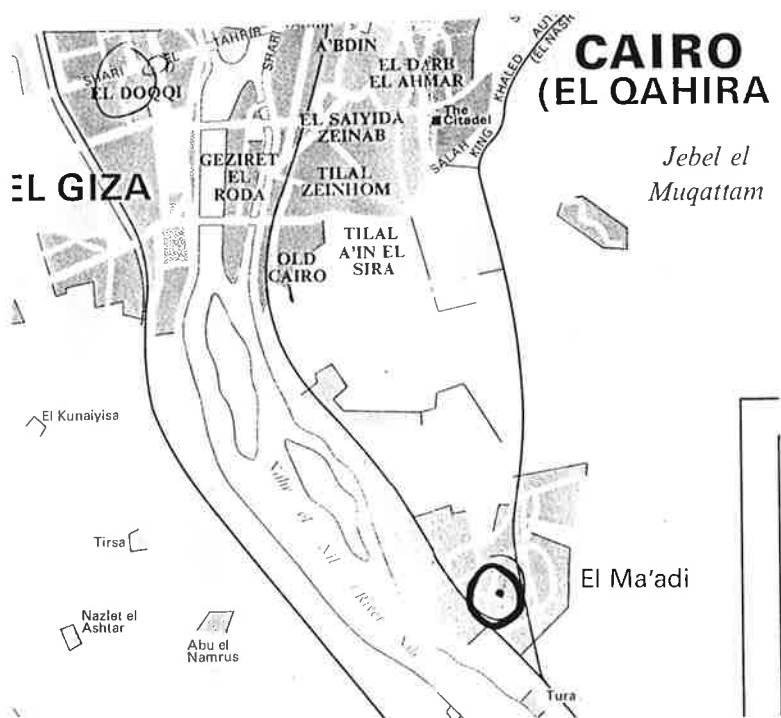
Personnel: Mon. Lab.

Air quality monitoring network

Site visit report

SiteName: Maadi Police station

Co-ordinates: UTM: X: 332.2, Y: 3315.3



El Maadi

Air quality monitoring network Site visit report

SiteName: Tabbin institute, Energy Conservation building
Co-ordinates: UTM: X: 336.2, Y: 3333.5

Access/availability: Easily through main gate on road south of TIMS. Parking place available outside building, which is also used for storage of EIMP instruments.

Buildings and rooms available: Room nicely prepared in the 5th floor of the north eastern corner of the Energy Conservation Building

Area description: Industrial, polluted from several cement factories and others north of the site, and smelters and chemical industries to the south.

Local sources: Smelters, steel and iron factories, coke factory within 1 km to the south, cement factories in the sector north-west to north east.

Representativity: Very polluted industrial area. Data will show impact of industries on the building.

Parameters to be measured: SO₂, NO_x, PM₁₀, TSP, dustfall, meteorology.

Measurement equipment: Monitors (SO₂, NO_x, PM₁₀), TSP sampler, dust fall collector and Automatic Weather Station on 10 m mast.

Infrastructure: **Power:** 220 V available.

Telephone lines: will be taken from the building.

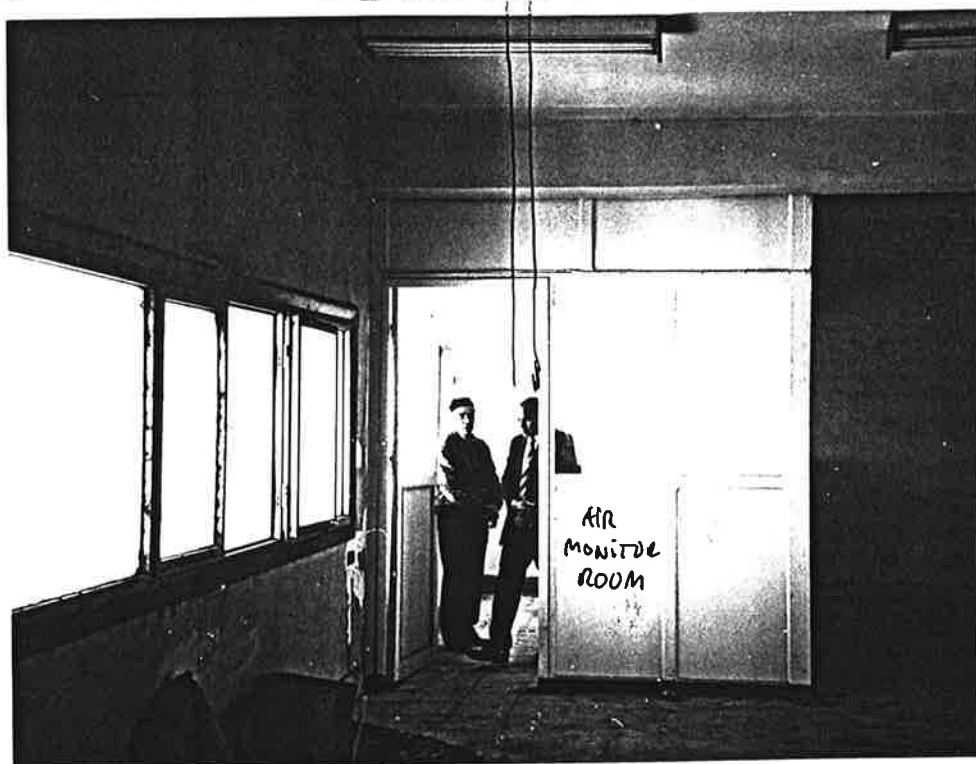
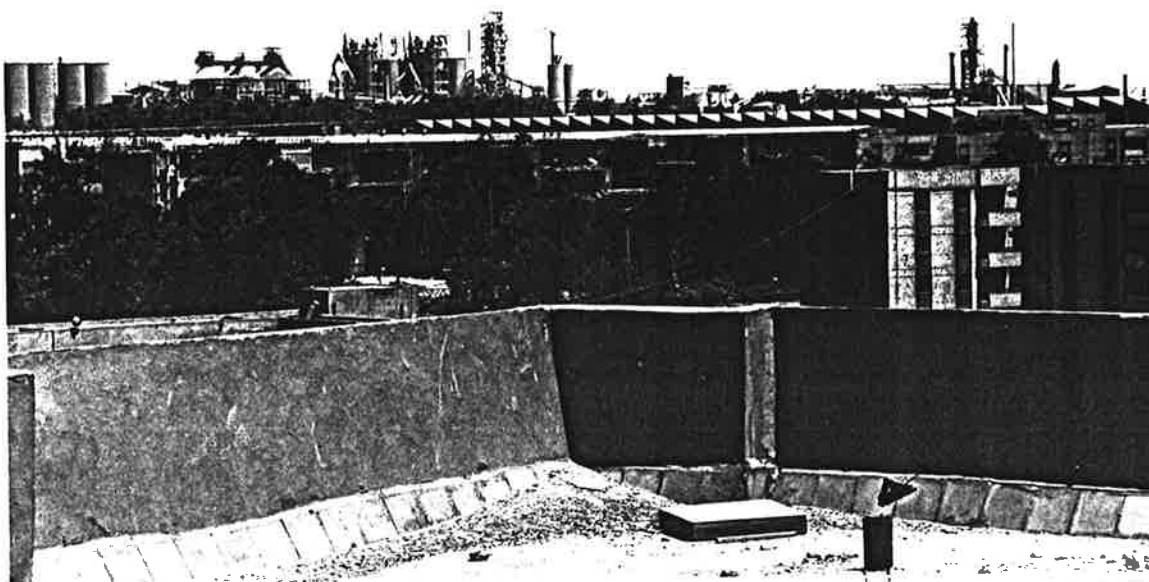
Sampler/monitor locations: In the room prepared on the 5th floor.

Air intake: About 12 m above ground.

Personnel: Locally at TIMS

Air quality monitoring network Site visit report

SiteName: Tabbín institute, Energy Conservation building
Co-ordinates: UTM: X: 336.2, Y: 3333.5



Air quality monitoring network Site visit report

SiteName: Giza, Cairo university

Co-ordinates: UTM: X: 326.9, Y: 3324.1

Access/ availability: Through gate for dormitory from Abdel Salam Arif street.
Parking outside dormitory.

Buildings and rooms available: Room in the first floor of one of the dormitory buildings, meteorological mast on lawn in the middle of the square.

Area description: Residential.

Local sources: Few local sources. Traffic more than 100m away from intake.

Representativity: Representative for the kilometre scale pollution in the Giza area generally.

Parameters to be measured: SO₂, NO_x, PM₁₀, ozone, other gases and meteorology (Automatic Weather Station).

Measurement equipment: Monitors and AWS.

Infrastructure: Power: 220 V available

Telephone lines: Has to be taken from outside?

Sampler/monitor locations: In a small room at 3. floor

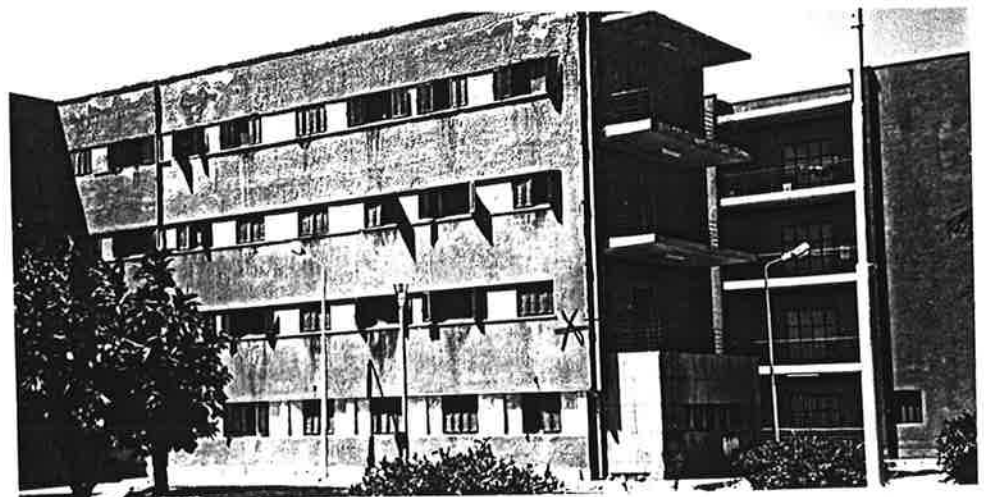
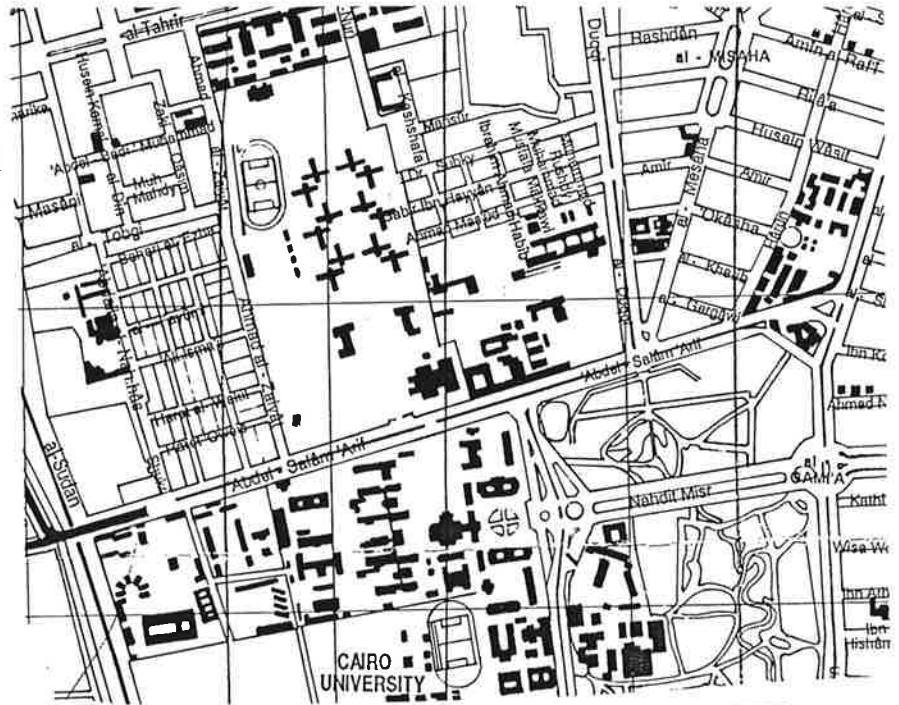
Air intake: About 8 m above ground

Personnel: Mon. Lab. personnel at Cairo University (EHML).
Check door width, prepare and clean room.

Air quality monitoring network Site visit report

SiteName: Giza, Cairo university

Coordinates: UTM: X: 326.9, Y: 3324.1



Air quality monitoring network Site visit report

SiteName: Giza Pyramids

Co-ordinates: UTM: 319.9, 3317.5 (map 35R)

Access/ availability: Easily north west of Kufu Pyramid.

Buildings and rooms available: Passive samplers to be located on the office buildings or near to the Pyramids and the Sphinx.

Area description: Pyramid area, at beginning of Western Desert.

Local sources: Some traffic, dust.

Representativity: In Pyramid area, for estimating impact on cultural monuments .

Parameters to be measured: SO₂, NO₂.

Measurement equipment: Passive samplers (sequential samplers in future?)

Infrastructure: Power: 220 V available.

Telephone lines: Telephone lines not needed.

Sampler/monitor locations: Near buildings.

Air intake: At 3m above ground.

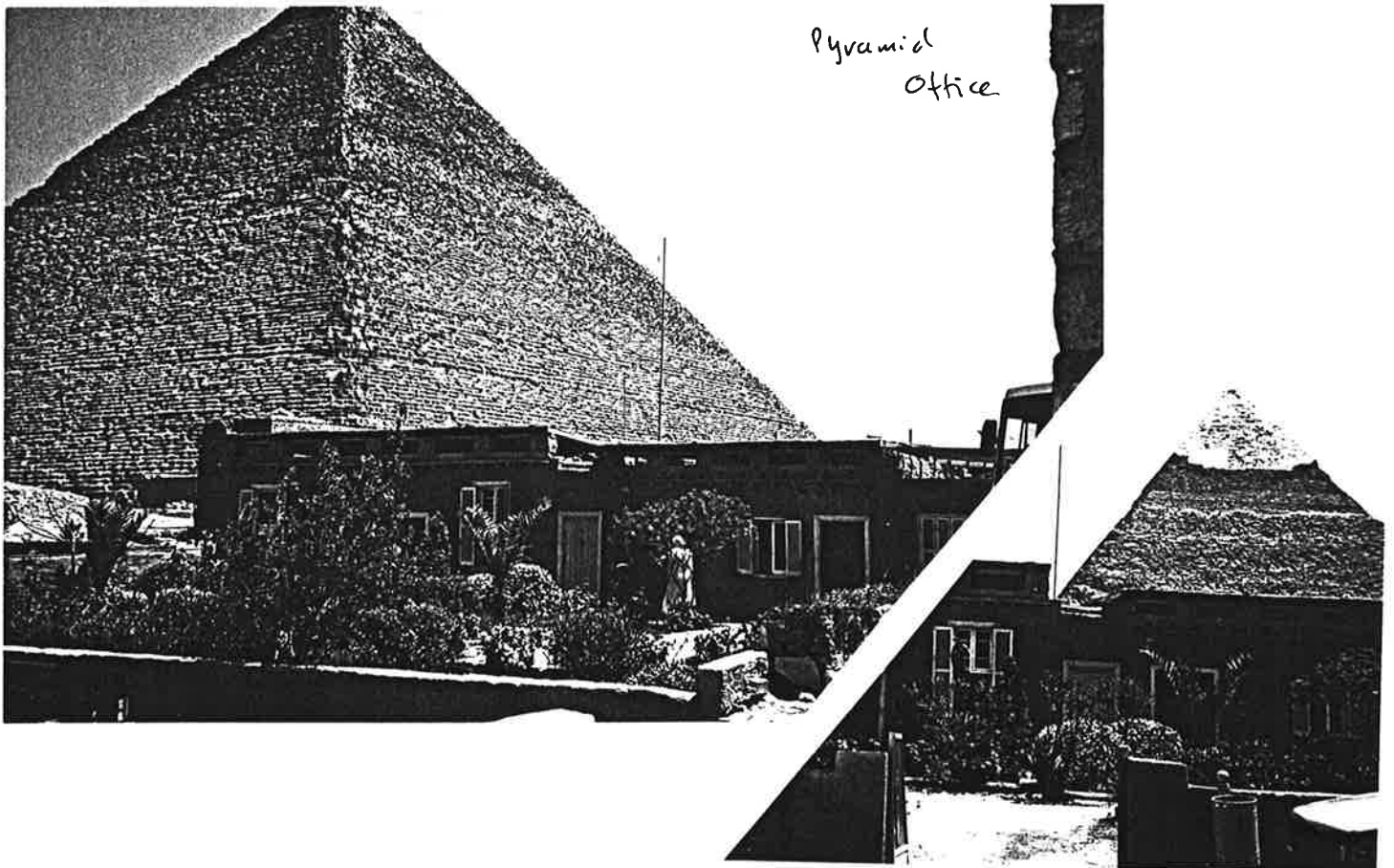
Personnel: The person responsible is Dr. Zaki Hawass, Director of Giza Pyramid area.

Tel: 202 38 33043

Air quality monitoring network Site visit report

SiteName: Giza Pyramids

Co-ordinates: UTM: 319.9, 3317.5 (map 35R)



Air quality monitoring network Site visit report, Alexandria

SiteName: Abu Quir , Air Defence College
Co-ordinates: UTM: (map 35R) 529.4, 953.1

Access/availability: Through main gate of the Air Defence College.
Identification needed, strong control.

Buildings and rooms available: A room will be made available in a one floor building. (hospital)

Area description: Industrial area , the site is downwind (ESE) from several industries

Local sources: Fertilizer only 400 m upwind from the site. (yellow NO_x plume and ammonia aerosols!). Paper and pulp industry, chemical industries, Petrojet petrochemical factories, power plant (gas and heavy residue oil).

Representativity: Representative of impact from industries.

Parameters to be measured: SO₂, NO_x, TSP (occasionally other samples?)

Measurement equipment: Monitors and a high vol. sampler.

Infrastructure: Power: 220 V available in the laboratory and at the roof.

Telephone lines: Taken from the College.

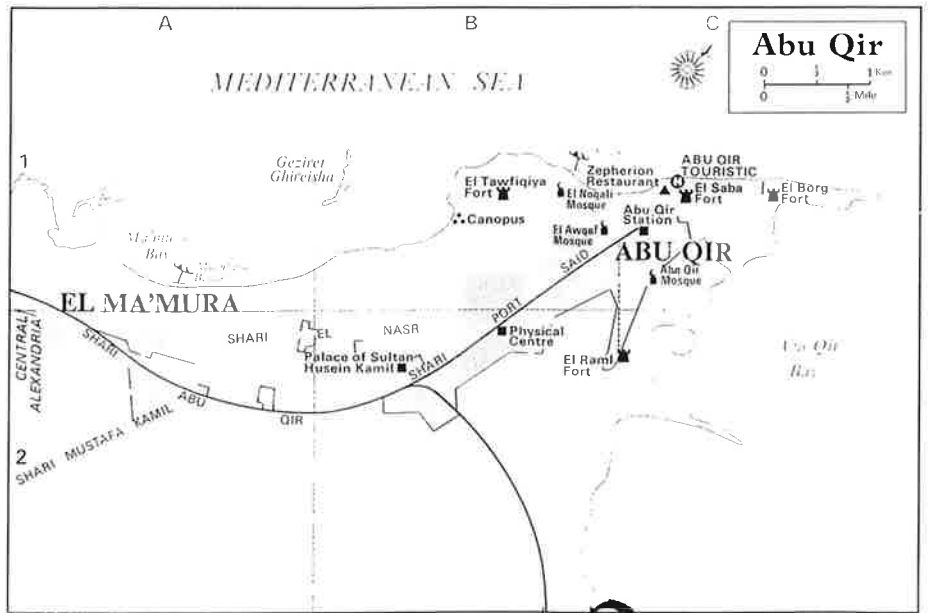
Sampler/monitor locations: In room.

Air intake: From above the roof about 3 m above ground.

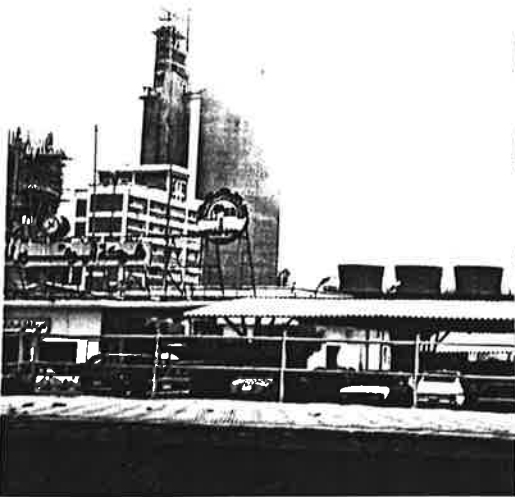
Personnel: Said Shallaby, local. Ahmed Monsour Ahmed
Agreement has to be established with the ministry of Defence (Dr. Nasar)

Air quality monitoring network Site visit report, Alexandria

SiteName: Abu Quir , Air Defence College
Co-ordinates: UTM: (map 35R) 529.4, 953.1



Ammoniacal NO_x



Air quality monitoring network Site visit report, Alexandria

SiteName: ElMax, (Petrogas Company Building)

Co-ordinates: UTM: (map 35R) 504.8, 937.5

Access/ availability: Very easy , parking outside building , along main road.

Buildings and rooms available: A shelter will be constructed at the low one storey building roof.

Area description: Industrial.

Local sources: Cement factory (Portland Cement) about 500 m to NNW, Alex Petroleum Company Refinery 500 m. NNW, chemical industries about 1 km NW.

Representativity: Representative of impact from industries. There is a village between the industries and the measurement site.

Parameters to be measured: SO₂, NO₂, PM₁₀, dustfall

Measurement equipment: Samplers, typical sampling station.

Infrastructure: Power: 220 V available in the laboratory and at the roof.

Telephone lines: No .

Sampler/monitor locations: At roof

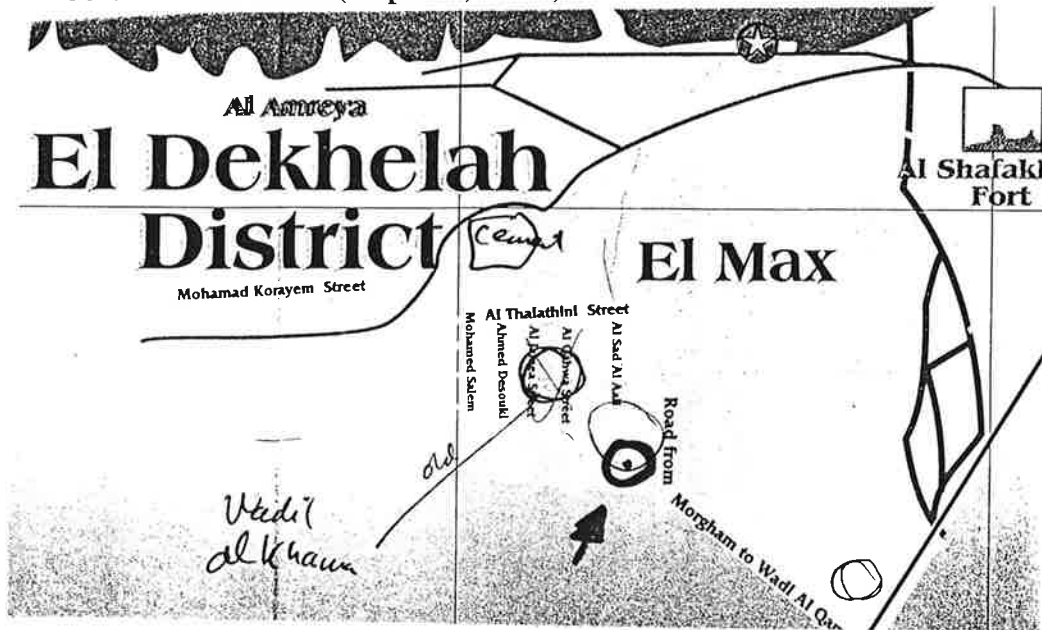
Air intake: About 4 m above ground..

Personnel: Said Shallaby, local. General Director of Petrogas Company.

Comment: A. Andersen High Volume sampler was left (not in operation) at the roof. Used by Dr. Dhakhakny.

Air quality monitoring network Site visit report, Alexandria

SiteName: ElMax, (Petrogas Company Building)
Co-ordinates: UTM: (map 35R) 504.8, 937.5



Air quality monitoring network Site visit report, Alexandria

SiteName: IGSR Univ. of Alexandria (Inst. Graduate Studies and Research)

Co-ordinates: UTM: 778 149, 3455 800 (map 35R)

Access/availability: Easily on Abdel Nasser road (parking inside gate).

Buildings and rooms available: Shelter to be located with monitors on the roof of the security building at the entrance. Weather station at the roof about 20 m above the ground).

Area description: Urban centre, road side station close to Nasser Road (Horoya street), the most trafficked road in Alexandria.

Local sources: Traffic, urban centre.

Representativity: Representative for urban centre and large trafficked road .

Parameters to be measured: SO₂, NO_x, PM₁₀, HC, CO, meteorology.

Measurement equipment: Monitors

Infrastructure: Power: 220 V available.

Telephone lines: Telephone lines will be available.

Sampler/monitor locations: In shelter on roof of security building.

Air intake: At 3m above ground 10 m from road.

Personnel: The person responsible is Dr M El-Raey and Dr. Said Shallaby.

Air quality monitoring network Site visit report, Alexandria

SiteName: IGSR Univ. of Alexandria (Inst. Graduate Studies and Research)

Co-ordinates: UTM: 778 149, 3455 800 (map 35R)



Dr. Nour

Dr. Saïd Shallaby

Air quality monitoring network Site visit report, Alexandria

SiteName: Al Azhar University, Al Azafra area

Co-ordinates: UTM: (map NH36,N1c) 520.4, 951.1

Access/ availability: Along Al Mahad Al Dini Street, low building just inside gate.

Buildings and rooms available: A shelter must be constructed on the roof of the low building. (University for girls)

Area description: Residential area

Local sources: Open area representative for large scale average pollution downwind from the Montaza district.

Representativity: Representative of the regional scale air pollution in a residential area located downwind from one district of Alexandria..

Parameters to be measured (possible future site): SO₂, PM₁₀.

Measurement equipment: Monitors.

Infrastructure: Power: 220 V available

Telephone lines: Taken from outside. .

Sampler/monitor locations: In shelter on roof

Air intake: About 3 m above ground..

Personnel: Said Shallaby, Ashraf A Zahra(v).

Air quality monitoring network Site visit report, Alexandria

SiteName: Somoha (student dormitory)

Co-ordinates: UTM: (map NH35,p3b) 513.4, 944.3

Access/ availability: Inside gate of student dormitory for Alexandria University.

Buildings and rooms available: A room inside the second floor balcony, ca. 30 m from main entrance.

Area description: Residential area.

Local sources: Small industries, workshops, wool industry.

Representativity: Representative of the regional scale air pollution in a residential area located downwind from central Alexandria.

Parameters to be measured (possible future site): SO₂, NO₂, PM₁₀.
Also an alternative site for the Automatic Weather station, at the roof of a building ca. 12 m above the surface.

Measurement equipment: Samplers, typical sampling station (+ AWS?)

Infrastructure: Power: 220 V available

Telephone lines: No for samplers, For AWS taken from outside. .

Sampler/monitor locations: Samplers on balcony, AWS at the roof

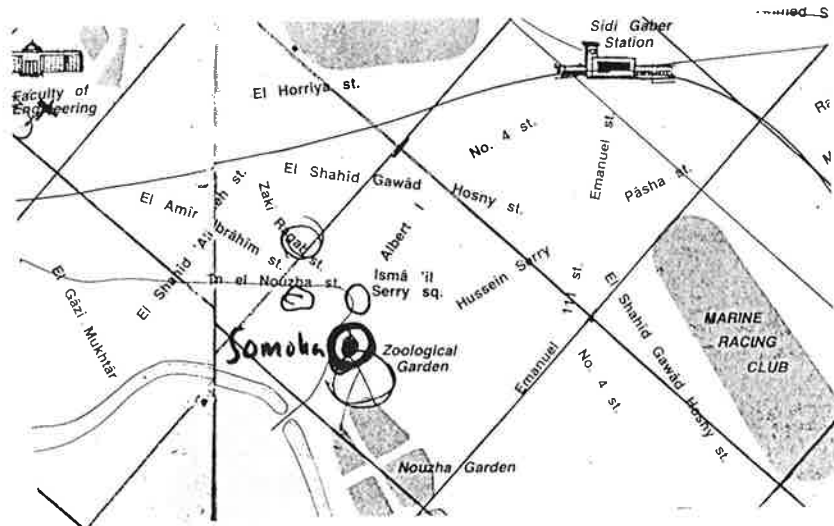
Air intake: About 3 m above ground..

Personnel: Said Shallaby, Ashraf A Zahra(v).

Air quality monitoring network Site visit report, Alexandria

SiteName: Somoha (student dormitory)

Co-ordinates: UTM: (map NH35,p3b) 513.4, 944.3



Air quality monitoring network Site visit report, Alexandria

SiteName: Gheat El-Enab area, (El Nil school), Alexandria

Co-ordinates: UTM: (map 35R) 510.0, 941.5

Access/ availability: From narrow street crossing Kanal Al Mahmoudia
ElQuabi Street

Buildings and rooms available: A shelter will be constructed at a small roof
outside a class room.

Area description: Residential/urban

Local sources: Open air waste burning, small industries.

Representativity: Representative of the regional scale air pollution in a
residential area located downwind from central Alexandria with a variety of
pollution sources.

Parameters to be measured: SO₂, NO₂, PM₁₀

Measurement equipment: Samplers, typical sampling station.

Infrastructure: Power: 220 V available in the laboratory and at the roof.

Telephone lines: No .

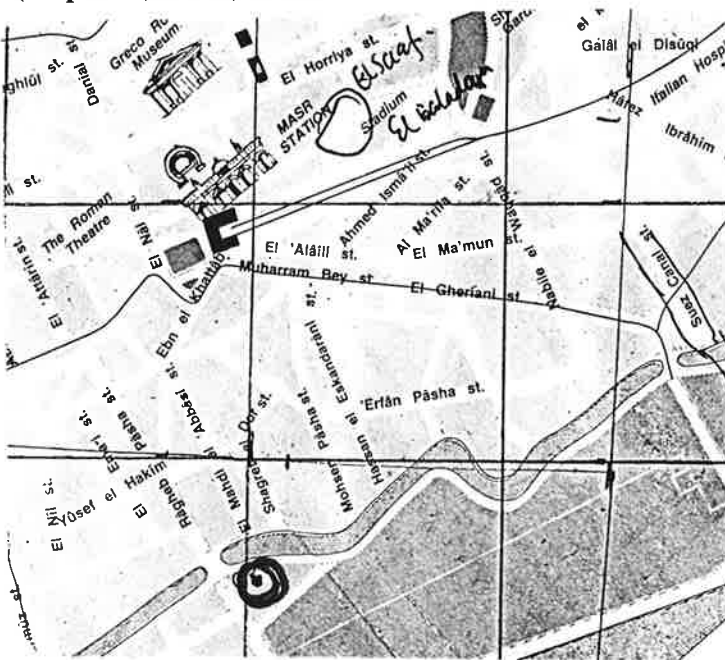
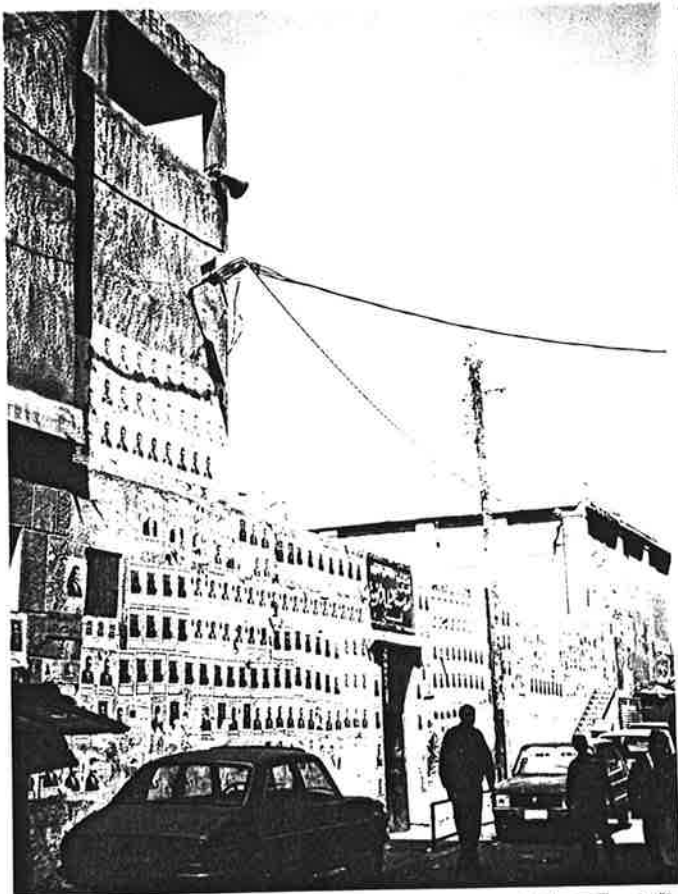
Sampler/monitor locations: At roof

Air intake: About 10 m above ground..

Personnel: Said Shallaby, Mohammed Abdel Aziz

Air quality monitoring network Site visit report, Alexandria

SiteName: Gheat El-Enab area, (El Nil school), Alexandria
Co-ordinates: UTM: (map 35R) 510.0, 941.5



Air quality monitoring network Site visit report

SiteName: NIOF (National Institute for Oceanography and Fisheries)

Co-ordinates: UTM: --

Access/availability: Easy to park 500 m before Qayetbay Fort on 26 July Street.

Buildings and rooms available: The roof of the laboratories has an air conditioned room, perfect for ozone monitor..

Area description: Outside city centre, but not background

Local sources: Some traffic but the wind is mostly (>80% of he time?) coming from the sea.

Representativity: Almost background.

Parameters to be measured: Ozone (could be also meteorology in future?).

Measurement equipment: Monitor

Infrastructure: **Power:** 220 V available.

Telephone lines: Telephone lines available.

Sampler/monitor locations: Near buildings

Air intake: At 6m above ground

Personnel: The person responsible is Dr Ali Ibrahim Beltagy

Air quality monitoring network

Site visit report

SiteName: 10 Ramadan city

Co-ordinates: UTM:

Access/ availability: Easily from Ahmed Hamdi street. Parking at entrance. The building belongs to the district administration and is located next to AlAshira mosque.

Buildings and rooms available: A shelter will be constructed on the roof or a small room may be obtained. Details will be discussed later.

Area description: Residential area in central part of TenRamadan City (Neighbourhood no. 3 in First Stage city).

Local sources: Some smaller industries ca. 1 km to the north (upwind). Some industries to the west, but the major industrial park is located to the south and south east; 2-3-km away. Not very polluted area.

Representativity: The site is representative for the Residential new city of TenRamadan.

Parameters to be measured: SO₂, PM₁₀.

Measurement equipment: Monitor for SO₂, PM₁₀ sampler.

Infrastructure: Power: 220 V available in the building.

Telephone lines: Will be taken from outside.

Monitor locations: At roof about 3 m above the ground.

Air intake: About 5 m above ground.

Contact persons: Wegiha Ahmed Turkry (engineer), Mr. Abdel Hakkan (Agency Office, undersecr. for Development) Mr. Engin Adri and secr. for Director Mahmoud Mansour.

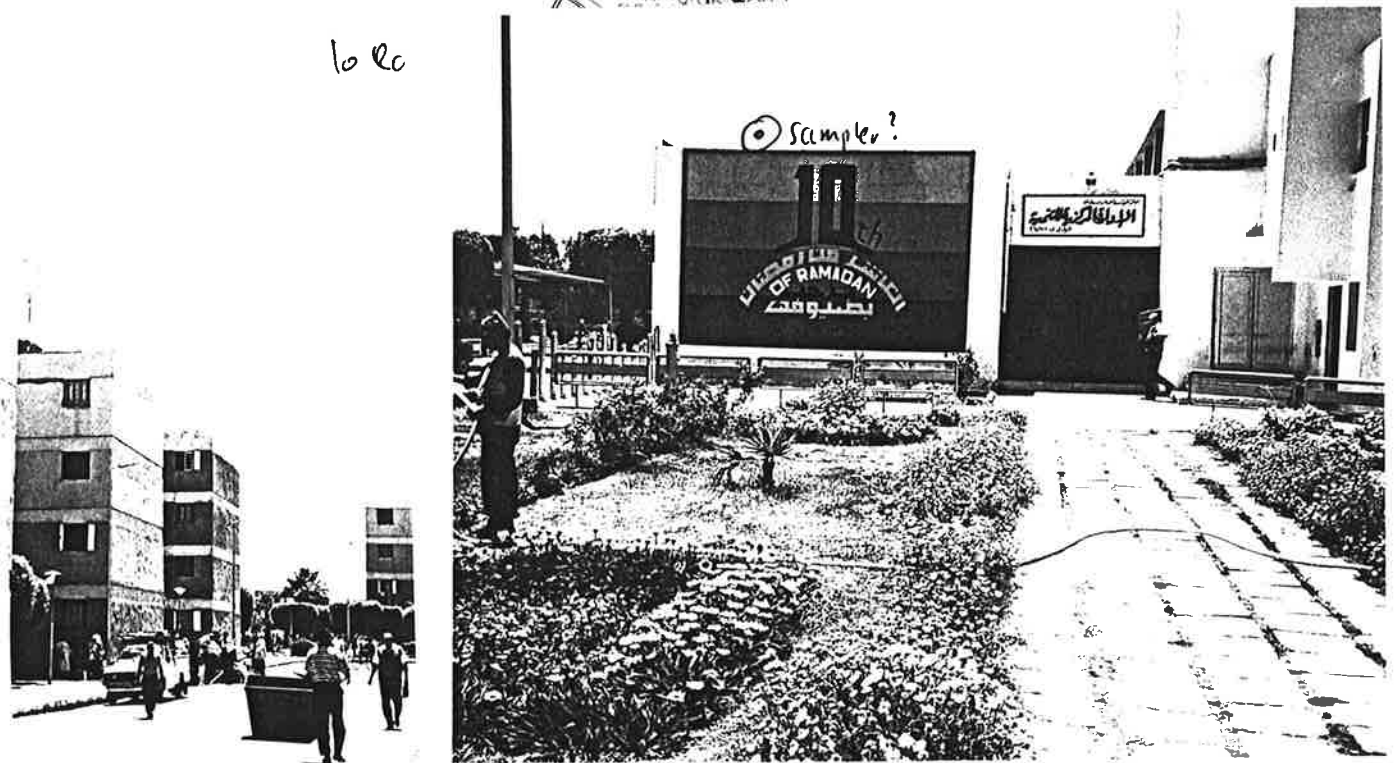
Three sites were pointed out in TenRamadan, but Neighbourhood 3 seemed to be most representative for the central residential area. (see Map).

Air quality monitoring network Site visit report

SiteName: 10 Ramadan city
Co-ordinates: UTM:



to be



Neighbourhood no. 3. (Stage 1)

Air quality monitoring network Site visit report

SiteName: 10 Ramadan city

Co-ordinates: UTM:



Air quality monitoring network Site visit report

SiteName: 6 October city

Co-ordinates: UTM:

Access/ availability: Easily in front of the school in 6 October, 6 District 6 neighbourhood at The Al Ashar school. (see map)

Buildings and rooms available: A room will be made available on the second floor.

Area description: Residential area in southern part of 6 October city 6 District. About 17 000 flats; 50 000 people live in this district. In 6 October totally about 150.000 (per 1997). The area does not seem to be very polluted.

Local sources: Industrial areas are located 1 to 3 km west and north west of the site. All kinds of small and medium size industries are found. However, very few heavy polluting industries are yet established. Plans are to have these at the north western corner, about 5 km from the site.

Representativity: The site is representative for the Residential (low income) part of the city of Six October.

Parameters to be measured: SO₂, PM₁₀.

Measurement equipment: Sampler for SO₂, PM₁₀ (EK?).

Infrastructure: Power: 220 V available in the building.

Telephone lines:

Monitor locations: In a small room, 2. floor.

Air intake: About 5 m above the ground on western wall.

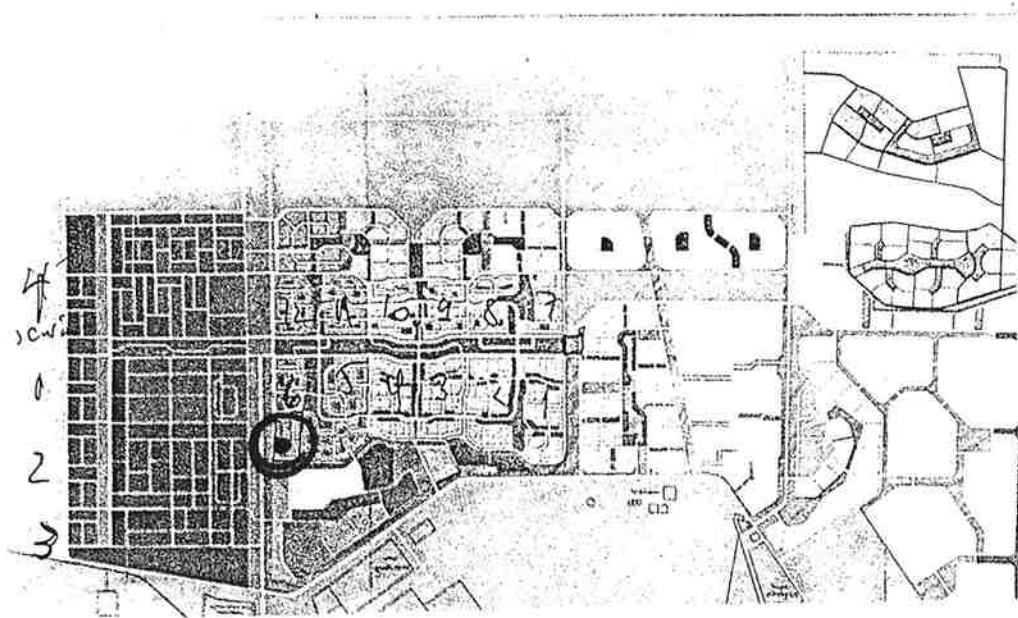
Contact persons: Head of Authority Eng. Ahmend Samir Abedollah.
Head Master of School: Mr. Hassan Mohammed Hassin?

Air quality monitoring network Site visit report

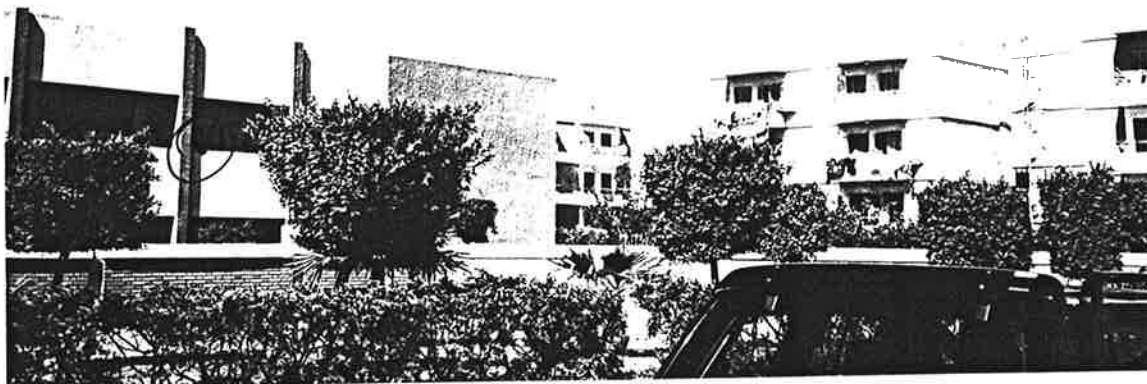
SiteName: 6 October city

Co-ordinates: UTM:

The Genarral planning



6th Oct
6 district
6 neighbourhood
school
→



Air quality monitoring network Site visit report

SiteName: Damanhur

Co-ordinates: UTM: X: ---, Y: ---

Access/ availability: Easy from the street, possible to park outside

Buildings and rooms available: Shelter on the roof of Moaz Ibn Gabal secondary school.

Area description: Residential/ industrial

Sources and representativity: Small industries in the area, work shops within 50 m from the site. Typical for industrial Damanhur.

Parameters to be measured: SO₂ , TSP

Measurement equipment: SO₂ monitor, TSP sampler

Infrastructure: Power: 220 V available in the school

Telephone lines: Has to be taken from outside

Sampler/monitor locations: At the roof, in specially designed shelter

Air intake: about 6 m above ground

Personnel: Teachers in physics : Samir George and Safwat Soryel.

Air quality monitoring network Site visit report

SiteName: Kafr ElZayet

Co-ordinates: UTM: X: ---, Y: ---

Access/ availability: From the street, possible to park outside

Buildings and rooms available: Shelter or a corner room on the roof of the school.

Area description: Residential/industrial - highly polluted, can smell chemicals at site.

Sources and representativity: Several industries upwind from the site (from about 300m). Emissions from pesticide factory, textile industries, soda- and oil industries and chemical industries. More than 50 brick factories with black smoke was counted west of the site.

Parameters to be measured: SO₂, NMHC, TSP

Measurement equipment: SO₂ and NMHC monitor, TSP sampler.

Infrastructure: Power: 220 V available in the school

Telephone lines: Has to be taken from outside

Sampler/monitor locations: At the roof, in shelter or room to be constructed.

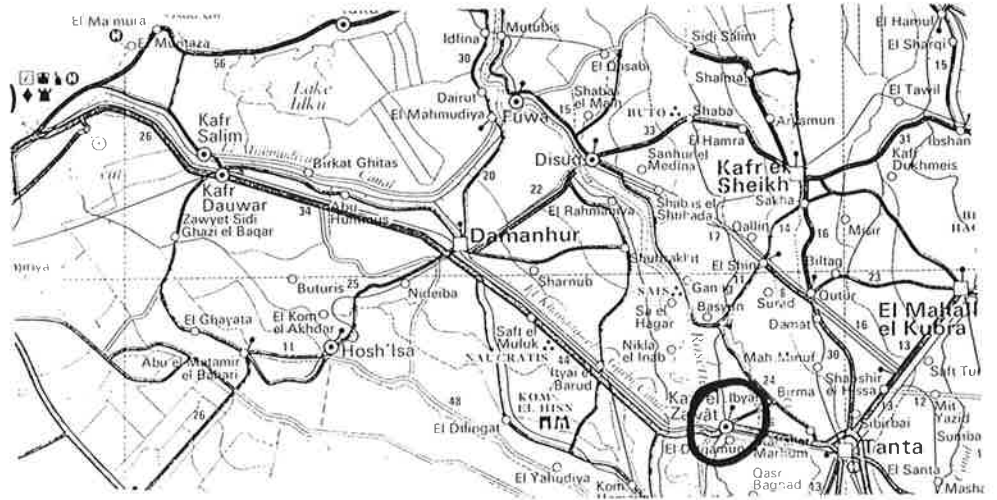
Air intake: About 6 m above ground.

Personnel: Teacher in physics interested: Ismahil El-Sharkawi.

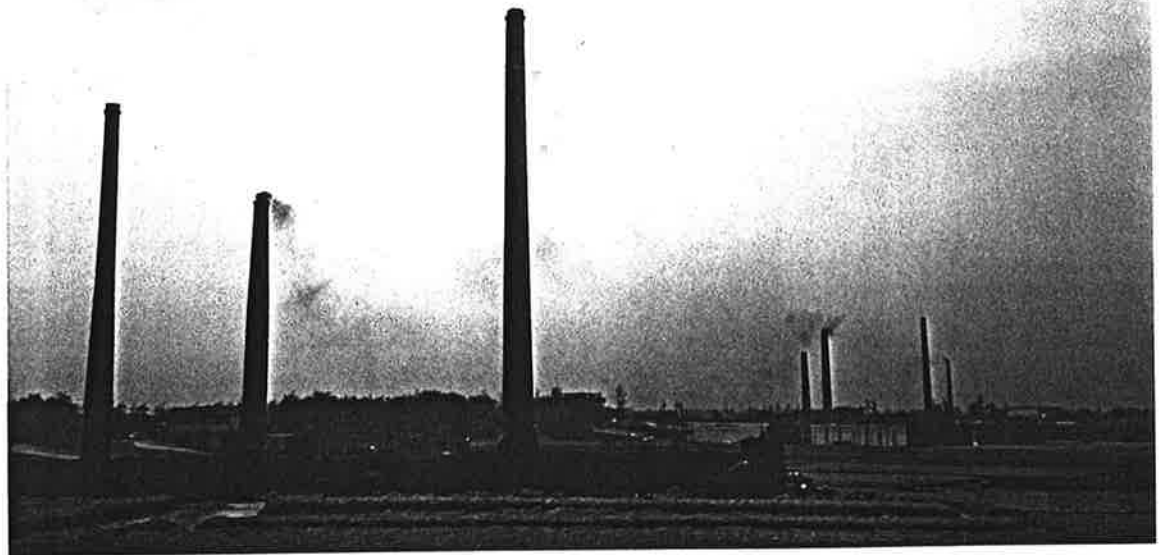
Air quality monitoring network Site visit report

SiteName: Kafr ElZayet

Co-ordinates: UTM: X: ---, Y: ---



The
hundred
brick
factories
→



Air quality monitoring network Site visit report, Alexandria

SiteName: Al-Mahalla, Al-Kubra

Co-ordinates: UTM:

Access/ availability: From 23 July Street (El Bahr street).

Buildings and rooms available: A shelter may be constructed on a balcony facing the street.

Area description: City Centre along main street.

Local sources: Traffic and some smaller industries near by. Al-Mahalla is a city of about 400 000 (est. 1991), leading textile manufacturing industries with cotton-processing and spinning mills.

Representativity: Pollution inside a typical city centre area..

Parameters to be measured: SO₂, NO_x and PM₁₀

Measurement equipment: Monitors and a high-vol. sampler.

Infrastructure: Power: 220 V available in the building.

Telephone lines: Taken from the telephone company.

Sampler/monitor locations: In shelter

Air intake: About 5 m above the surface 5 m from street.

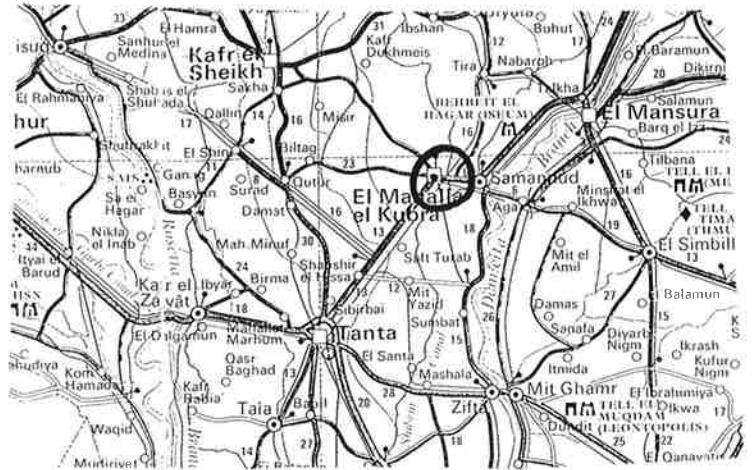
Personnel: District Secretary Mohammed Ishahawi.

We will need permission from the Governor of the District.

Air quality monitoring network Site visit report, Alexandria

SiteName: Al-Mahalla, Al-Kubra

Co-ordinates: UTM:



Air quality monitoring network

Site visit report, Alexandria

SiteName: ElMansura

Co-ordinates: UTM:

Access/ availability: In the narrow Mohammed Farid street behind Telephone Company

Buildings and rooms available: Meat Haddar Commercial Secondary School for Girls. Possibilities have to be investigated. Shelter on the roof seem to be a possible solution.

Area description: City Centre.

Local sources: Locally some traffic and downwind from industrial areas in Talkha on opposite side of the Nile river. Probably impacted by emissions from a fertilizer about 1 km north (on northern bank of the river). El Mansura is the capital of Daqahliya Governorate, on the Damietta branch of the Nile. It is a commercial centre with textile, food and other industries. Population estimated 1991 is 362 000.

Representativity: Polluted part of a city centre area.

Parameters to be measured: SO₂, NO_x, PM₁₀

Measurement equipment: Monitors.

Infrastructure: Power: 220 V available in the building.

Telephone lines: Taken from the telephone company.

Sampler/monitor locations: In shelter on roof?

Air intake: About 12 m above the ground.

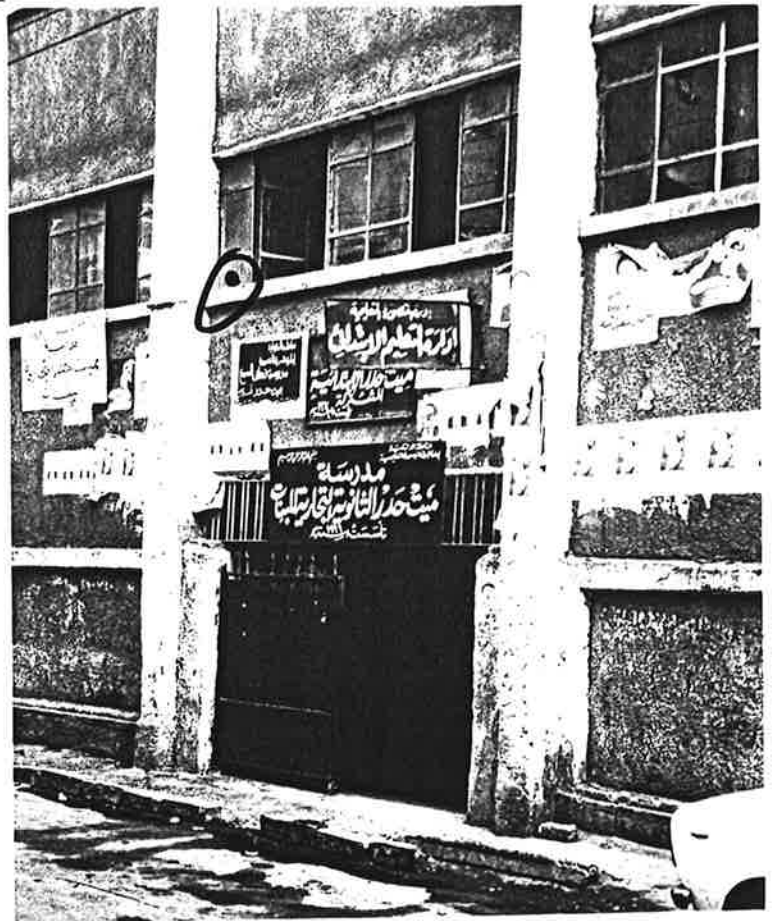
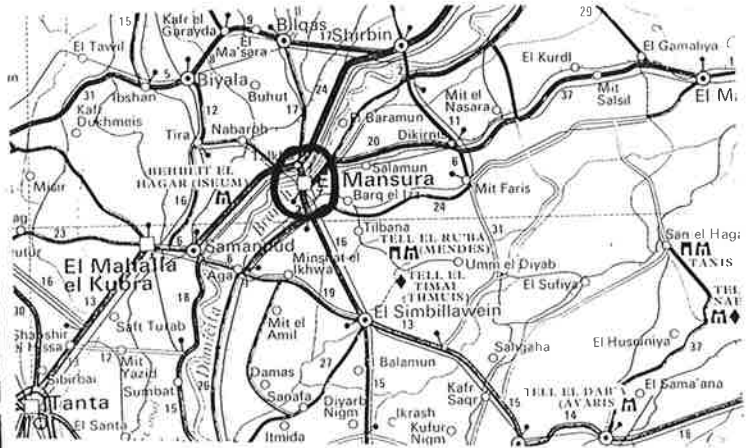
Personnel: --

Comment: We discussed the possibilities with the General Secretary at the District office, who could inform us the Atomic Energy Authority had placed a shelter for air pollution measurements only 600m north of the District Office building. We inspected the site, which has been standing there for one year without any measurements undertaken. The site seemed to be located somewhat too far north compared to the sources it was supposed to measure.

Air quality monitoring network Site visit report, Alexandria

SiteName: ElMansura

Co-ordinates: UTM:



Air quality monitoring network Site visit report

SiteName: Damietta

Co-ordinates: UTM: X: 691.75, Y: 968.2

Access/ availability: El Salamoni school in 4th District located in a small square in the middle of the city centre. Easy to park (difficult to find?).

Buildings and rooms available: Samplers at terrace 2. floor, TSP/PM₁₀ at the roof.

Area description: Residential with mixed small furniture industries in all streets surrounding the site.

Local sources: Several small furniture industries in all directions, handling wood, painting etc..

Representativity: Representative for the central part of Damietta.

Parameters to be measured: SO₂, particles/PM₁₀.

Measurement equipment: Simple equipment, EK (two filter sampler), VOC sampling in future.

Infrastructure: Power: Available

Telephone lines: not needed

Sampler/monitor locations: at terrace and at roof

Air intake: 5 m above the ground, TSP 7 m above the ground.

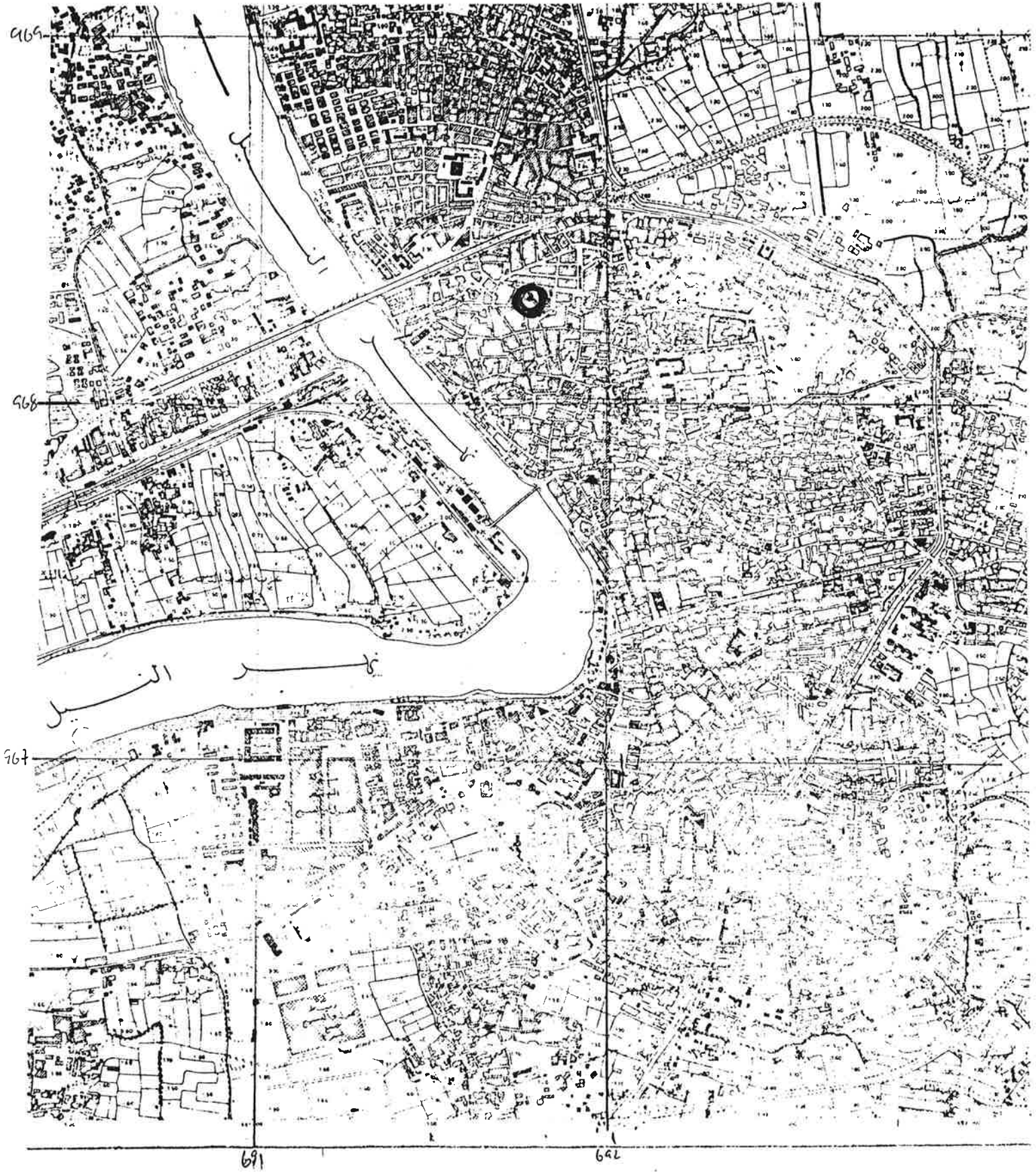
Personnel: Mr. Hassan Humran (EEAA representative)

We also met with Gen. Sec. of Governorate Radar ElRashidi.

Air quality monitoring network Site visit report

SiteName: Damietta

Co-ordinates: UTM: X: 691.75, Y: 968.2



Air quality monitoring network Site visit report

SiteName: Tanta

Co-ordinates: UTM:

Access/ availability: One possible location is the police station near El Saha Square, or in the central city along the main avenue across the street from the Faculty of Medicine?

Buildings and rooms available: Details have to be investigated.

Area description: Typical urban area. Tanta is the capital of Gharbiyuh Governorate. Industries include textile, processed food and tobacco products. Population estimated in 1986: 373.500.

Local sources: Traffic and small industries. Not highly polluted?

Representativity: Representative of the urban area.

Parameters to be measured (possible future site): SO₂, PM₁₀.

Measurement equipment: Monitors.

Infrastructure: Power:

Telephone lines: . .

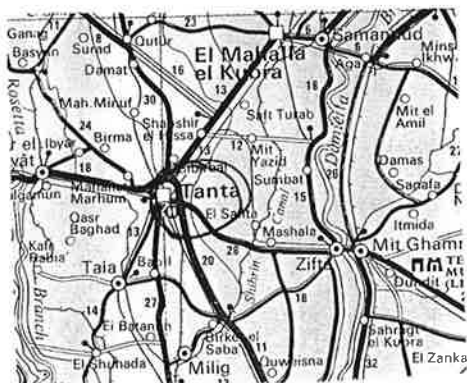
Sampler/monitor locations:

Air intake: About 3 m above ground.

Personnel: We will have to return for more detailed planning in Tanta. Could be a site for future consideration.??

Air quality monitoring network Site visit report

SiteName: Tanta
Co-ordinates: UTM:



Air quality monitoring network Site visit report

SiteName: Suez, City Centre

Co-ordinates: UTM: (map H 35, J2) (see local map)

Access/ availability: Park in street at small blue building, public transportation office at bus station.

Buildings and rooms available: A shelter or room has to be constructed at the roof of the one floor high blue transportation office owned by the Governorate.

Area description: Urban/ residential.

Local sources: Traffic and some small industries.

Representativity: Representative of the urban city centre of Suez with traffic, various activities, some burning etc..

Parameters to be measured: SO₂, NO₂, PM₁₀.

Measurement equipment: Monitors preferably.

Infrastructure: Power: 220 V available.

Telephone lines: To be taken from outside.

Sampler/monitor locations: At roof.

Air intake: About 5 m above ground/street.

Personnel: We met with the Governor of Suez.

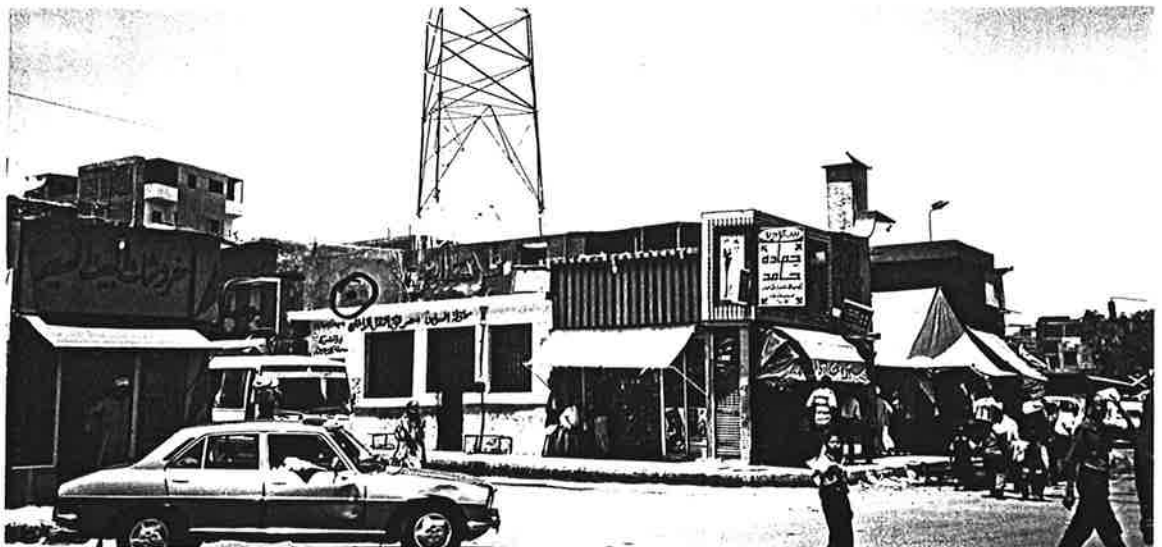
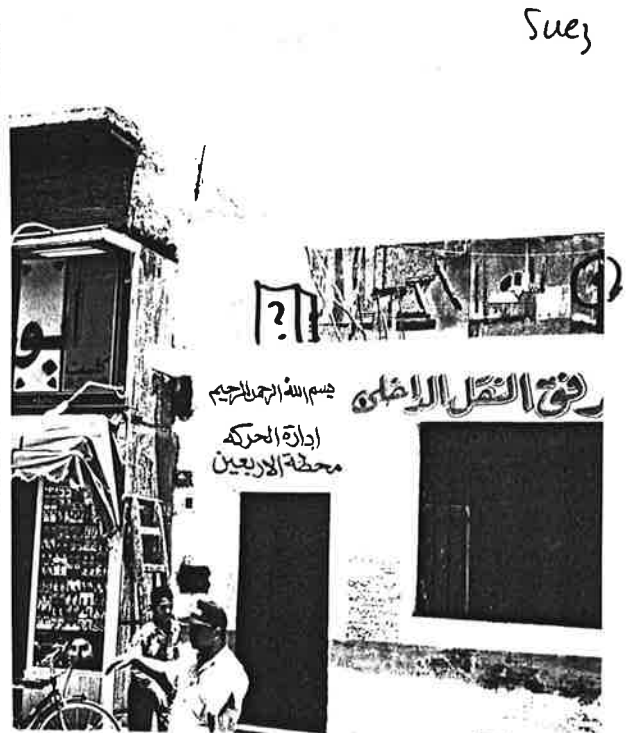
Discussed the set up with the General Secretary, Engineer M Sadik, who is responsible for measurements, and Environmental Engineer Samer Abdel Sadeq.

SComm.: Some funds have to be allocated to local "experts"(engineers) who are willing to undertake weekly controls in the Governates.

Air quality monitoring network Site visit report

SiteName: Suez, City Centre

Co-ordinates: UTM: (map H 35, J2) (see local map)



Air quality monitoring network

Site visit report

SiteName: Suez, 24 October area

Co-ordinates: UTM: (map H 35, J2) (see local map)

Access/availability: Easy to park at the school and access 3rd floor terrace.

Buildings and rooms available: A small room can be constructed on the terrace of the third floor, depending on instrumentation to be selected for this site.

Area description: Residential/ influenced by industrial emissions during a few weeks each year. (mostly winter season).

Local sources: Petrochemical industries and other industrial activities located 0,6 to 2 km south and south-west of the site.

Representativity: About 10 000 people live in the 24 October area, located near several industries. The site is located between the industries and the most populated areas.

Parameters to be measured: SO₂, dust and VOC (+NO₂).

Measurement equipment: Two filter samplers, bag sampling (canisters?) or passive samplers.

Infrastructure: **Power:** 220 V available.

Telephone lines: To be taken from outside.

Sampler/monitor locations: At terrace.

Air intake: About 12 m above ground/street.

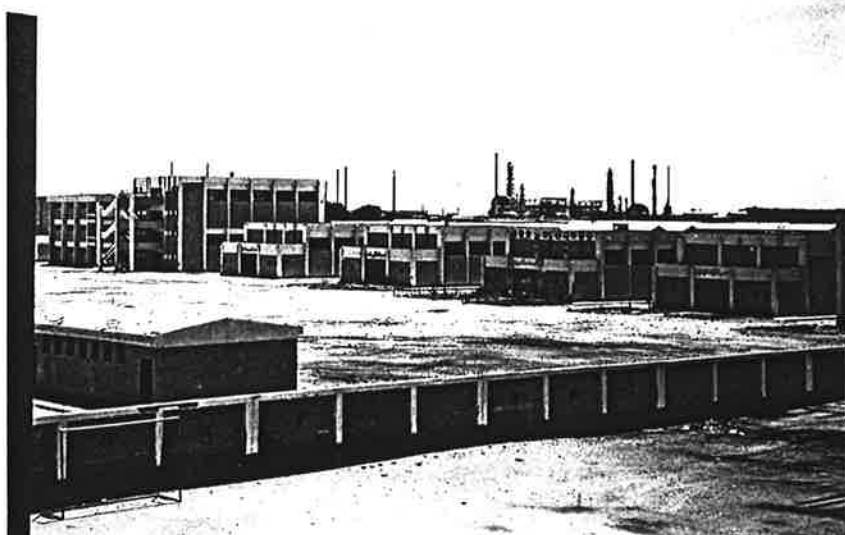
Personnel: Responsible for measurements and environment Eng. Samer Abdel Sadeq.

Air quality monitoring network

Site visit report

SiteName: Suez, 24 October area

Co-ordinates: UTM: (map H 35, J2) (see local map)



Air quality monitoring network Site visit report

SiteName: Port Said City Centre
Co-ordinates: UTM: (see local map)

Access/ availability: ElShahid Ahmed Ismahil street/Aswan street - parking outside entrance.

Buildings and rooms available: A small switch board room could be used, with intake through window.

Area description: Urban/residential.

Local sources: Traffic.

Representativity: Representative of the city centre (downwind from city).

Parameters to be measured: SO₂, NO₂, particles.

Measurement equipment: Simple equipment, samplers.

Infrastructure: **Power:** Available.
Telephone lines: Not needed
Sampler/monitor locations:
Air intake: 3 m above street level 8 m from street southern side.

Personnel: Mr. Hassan Oumran (EEAA representative)
Fax. 066 22 1023 Tel. 066 23 5641, 22 1903
Environmental responsible engineer Nagi Amin Port Said Governorate.

Air quality monitoring network Site visit report

SiteName: Port Said south industrial

Co-ordinates: UTM:

Access/ availability: Ahmed Shawqi elementary school on Nahda Misr street, easy parking.

Buildings and rooms available: A small roof, 2×2m 1,5m deep fence to be accessed by ladder.

Area description: Industrial/ residential.

Local sources: Some industries north and west of the site.

Representativity: Representative of the industrial impacted areas south of the city centre (downwind from city).

Parameters to be measured: SO₂, particles.

Measurement equipment: Simple equipment, passive samplers.

Infrastructure: Power: Available

Telephone lines: Not needed

Sampler/monitor locations:

Air intake: 5 m above the ground.

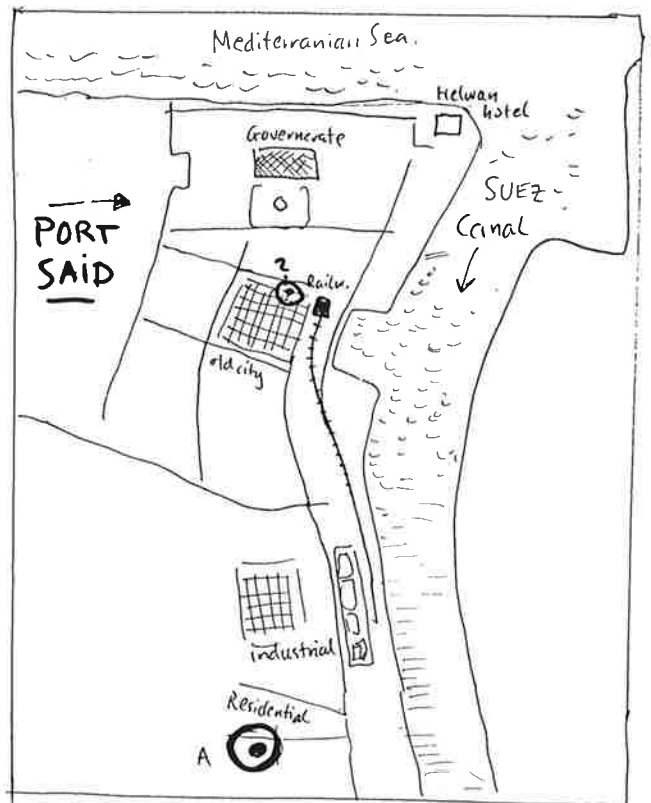
Personnel: Mr. Hassan Humran (EEAA representative)

Fax. 066 22 1023 Tel. 066 23 5641, 22 1903

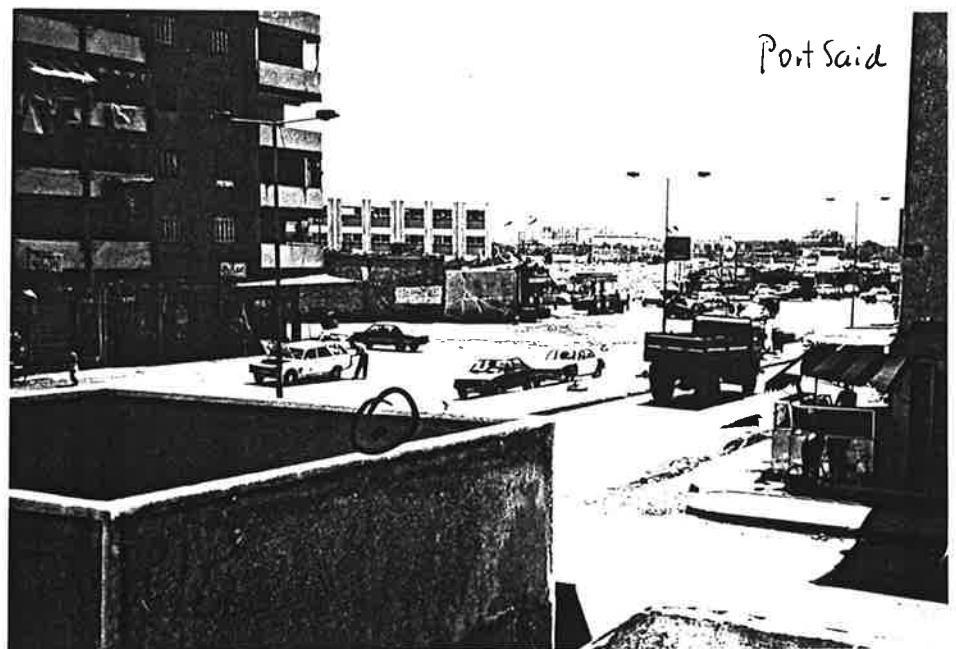
Environmental responsible engineer Nagi Amin Port Said Governorate.

Air quality monitoring network Site visit report

SiteName: Port Said south industrial
Co-ordinates: UTM:



School A



Air quality monitoring network Site visit report

SiteName: Ismailia

Co-ordinates: UTM: (see local map)

Access/ availability: From busy El Sekka el Hadid street (busy street, much traffic).

Buildings and rooms available: At Ismailia Railway Primary school in the future. Details to be decided later.

Area description: Urban/ residential

Local sources: Traffic bus station, railway and small industrial sources.

Representativity: Representative of the urban city centre of Ismailia.

Parameters to be measured: SO₂, NO₂, particles.

Measurement equipment: Simple equipment, passive samplers .

Infrastructure: Power:.

Telephone lines: Not needed

Sampler/monitor locations:

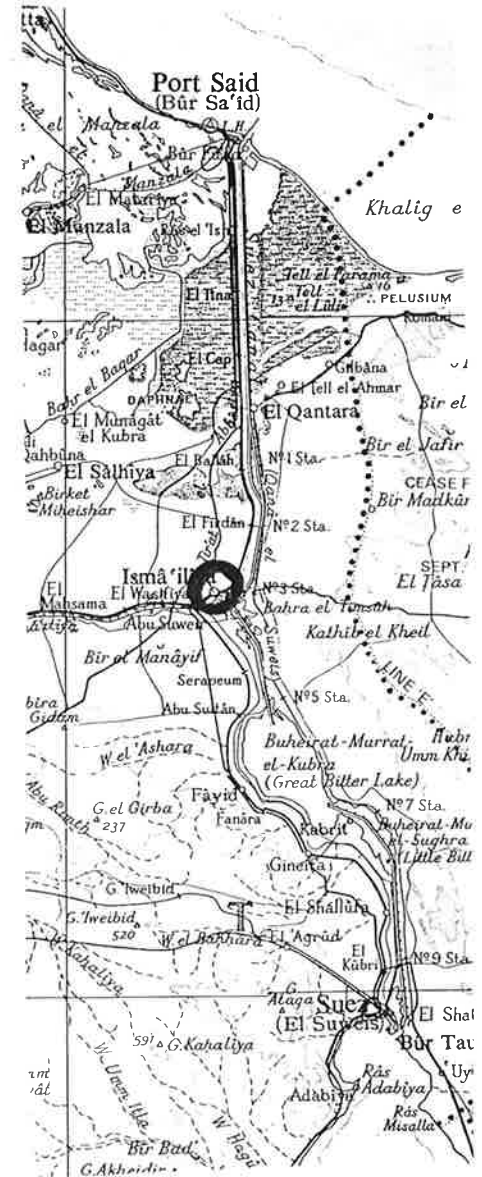
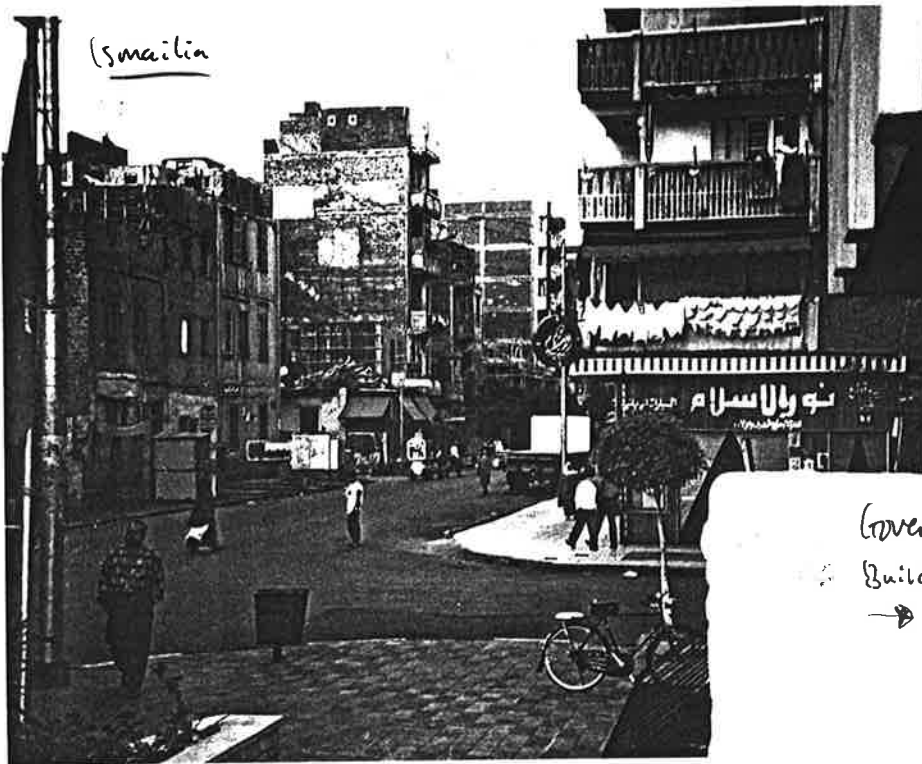
Air intake:.

Personnel:. Not appointed, Governorate will be contacted.

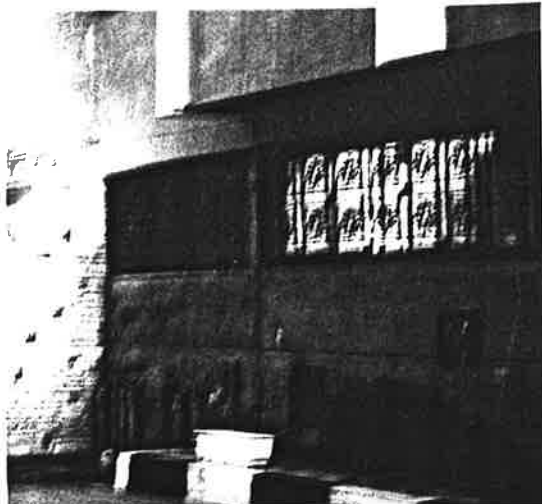
Air quality monitoring network Site visit report

SiteName: Ismailia

Co-ordinates: UTM: (see local map)



Governmental
building
→
(alternative 2)



Air quality monitoring network Site visit report

SiteName: Fayum, city centre

Co-ordinates: UTM: (see local map)

Access/ availability: Al Toufir Primary school in ElBota District in Horaya Street.

Buildings and rooms available: Samplers on the roof of small building at the entrance (meeting room).

Area description: Urban/Residential urban centre with high traffic on street along the canal.

Local sources: Traffic.

Representativity: Representative for the central part of Fayum city.

Parameters to be measured: SO₂, NO₂, particles/PM₁₀.

Measurement equipment: Simple equipment, passive samplers, +high vol. at selected periods ?.

Infrastructure: Power: Available

Telephone lines: Not needed

Sampler/monitor locations: On small roof

Air intake: 4 m above the ground, 5 m from the street.

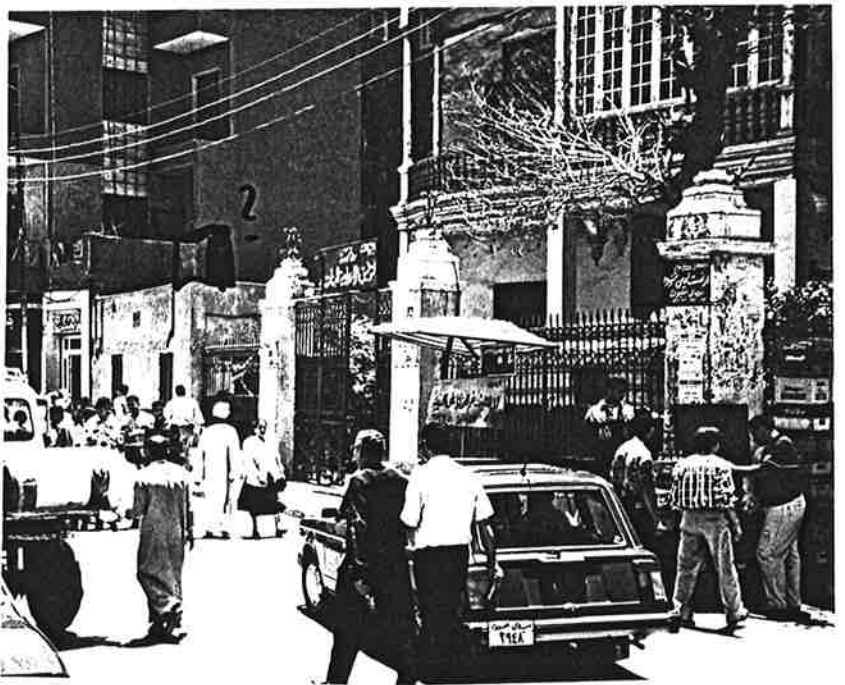
Personnel: Director of the school Mrs Eugenie Habib Melik

Tel: 32 0891

Director of El Fayum Education Governorate Mohammed Abdallah

Air quality monitoring network Site visit report

SiteName: Fayum, city centre
Co-ordinates: UTM: (see local map)



Air quality monitoring network Site visit report

SiteName: El Minya
Co-ordinates: UTM:

Access/ availability: Across the railroad track (from the Cornish) to the Governmental Building (belonging to Ministry of Irrigation).

Buildings and rooms available: Meeting room on third floor can be used for samplers (in window).

Area description: Urban/residential urban centre with traffic on the main street connecting Culture road and Desert road (to Upper Egypt).

Local sources: Traffic and various open burning.

Representativity: Representative for the central part of ElMinya.

Parameters to be measured: Particles/PM₁₀, and SO₂/NO₂ (passive samplers).

Measurement equipment: Two filter samplers and passive samplers at selected periods?

Infrastructure: Power: Available

Telephone lines: Not needed

Sampler/monitor locations: At the window of meeting room.

Air intake: 6 m above the ground, about 10 m from the street.

Personnel: Engineer Mohammed Taha, Tel: 086 34 4934

Air quality monitoring network

Site visit report

SiteName: Ras Mohammed , Sharm ElSheikh

Co-ordinates: UTM: X:, Y:

Access/ availability: 21 km from EEAA office in Sharm ElShaik on the road to Ras Mohammed. Laboratories on left side of the road.

Buildings and rooms available: One of the laboratories (air conditioned) in the EEAA laboratory building in Ras Mohammed..

Area description: Representative background area for ozone measurements.

Local sources: None, except for a few vehicles on the road 20 m away.

Representativity: Typical back ground area.

Parameters to be measured: Ozone.

Measurement equipment:

Infrastructure: Power: Available

Telephone lines: Not available, collection on diskettes.

Sampler/monitor locations: At terrace and at roof.

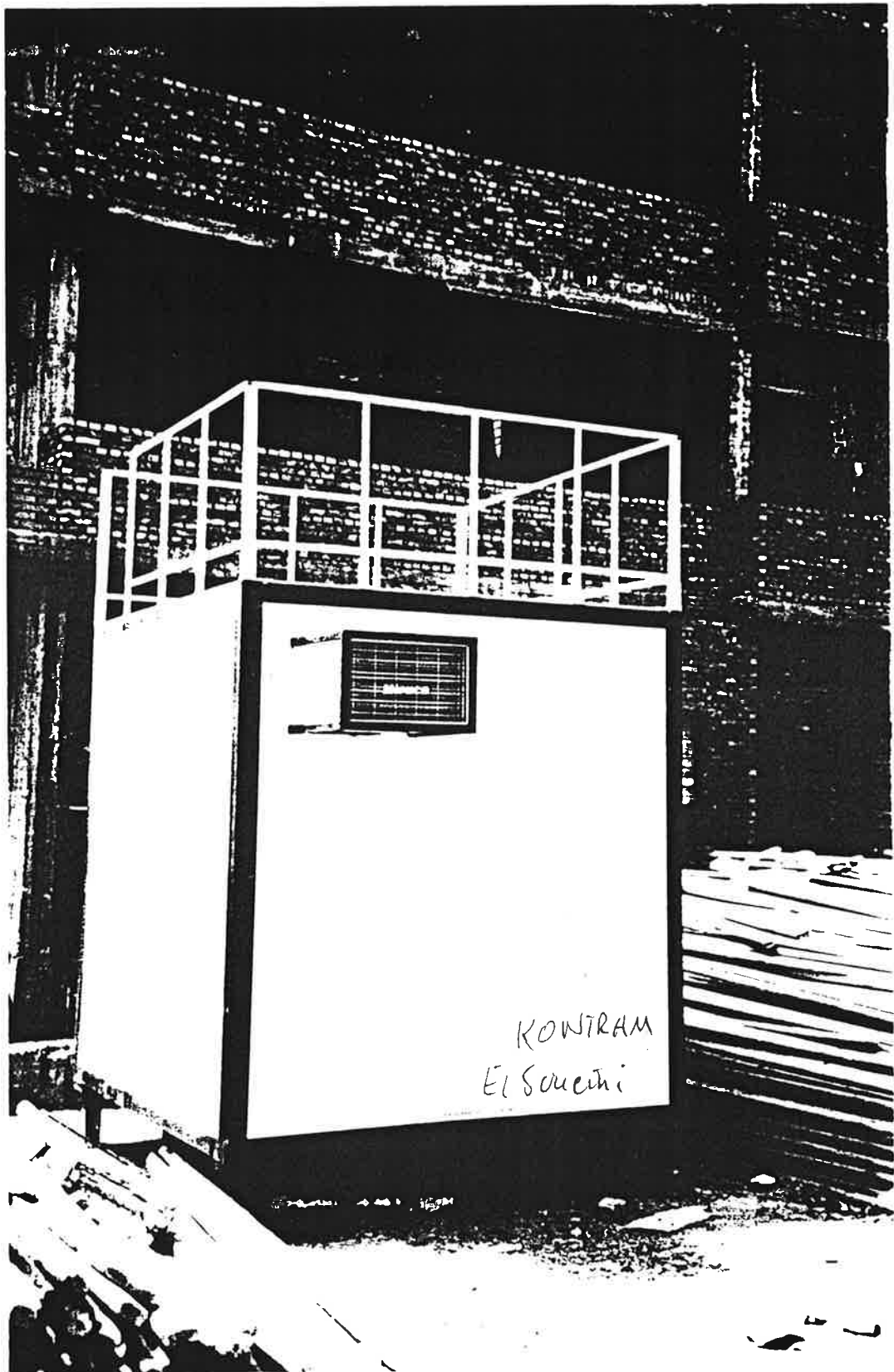
Air intake: 5 m above the ground.

Personnel: (EEAA representative)

We also met with Gen. Secr. of Governorate Radar ElRashidi.

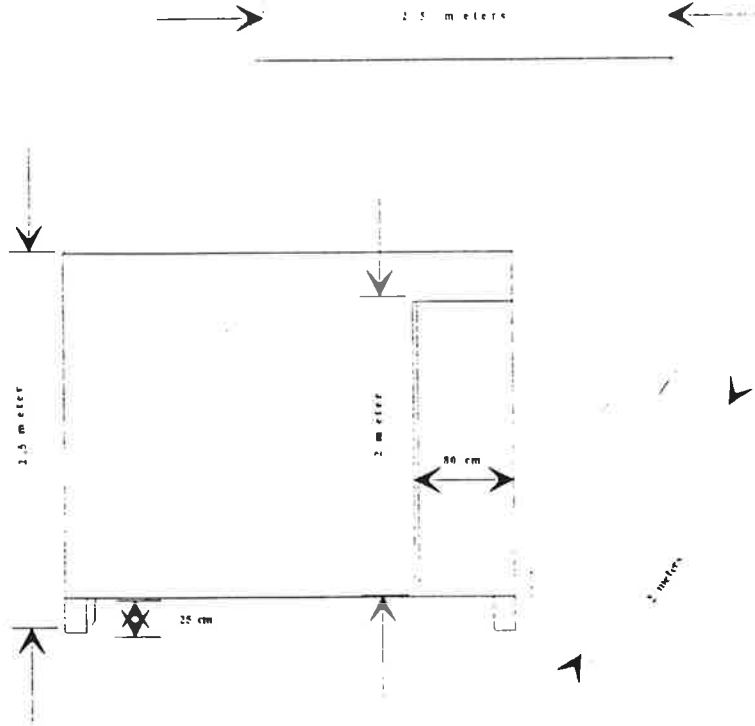
Appendix D

Typical shelter design for air quality monitoring



المواصفات

الطول :	2.5 متر
العرض :	2.0 متر
الارتفاع :	2.5 متر
باب عرض :	80 سم
باب ارتفاع :	2.0 متر
عدد 2 مصدر للكهرباء	16 امبير



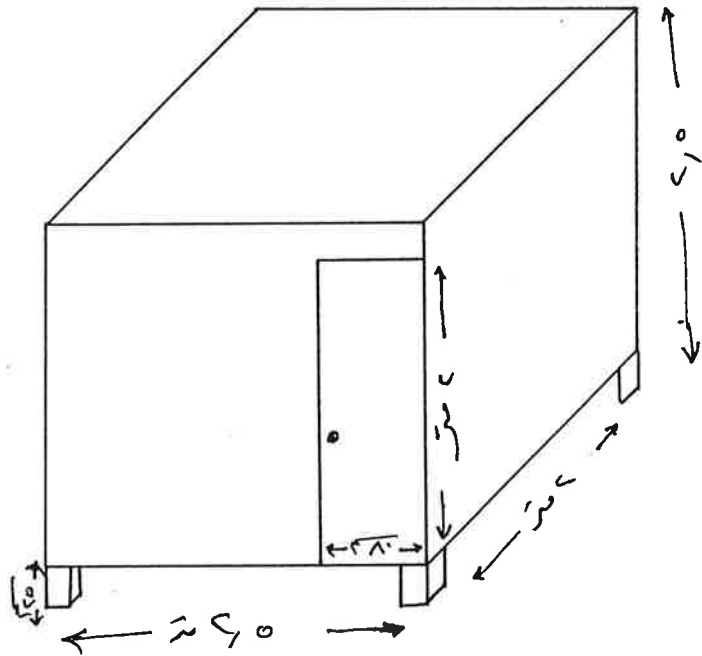
الجدران من رقائق الصلب او انصاج المجلفن سمك 2 مم و الخشب الكونتر 16 مم بينهما عازل سمك 3 سم

السقف والارضية مقواه لتحمل اجهزة زنة 150 كجم

احد الاجناب به فتحة لتركيب جهاز تكييف 1.5 حصان

المواصفات

الطول : ٦٥ متر
 العرض : ٦ متر
 الارتفاع : ٦٥ متر
 باب عرض ٨٠ سم - ارتفاع ٢ متر
 عدد مصادر التلوث (بديوه) ١٦ أبيض



الجدران من رقاعة الصليب أو الصاج الجبس سم ٤ سم والمثبت الكونتر ١٦ سم

بيضا عازل سم ٣

السقف والارضيه مقواه لتحمل أجهزة رنة ١٥٠ كجم

أحد الأضواء به شحنة لذكيه جواز تكيف ١/٤ حصانه

Appendix E

Updated time schedule 1997 and estimated schedule for 1998

**EIMP Air Pollution Monitoring Programme
Annual Plan of Action 1997
(updated 13 April 1997)**


ACTIVITY	month	1	2	3	4	5	6	7	8	9	10	11	12
A. Institutional support													
A.1.1 Air pollution monitoring working group													
A.2.1 Assist technical input to contract with mon.lab													
A.2.2 Assist in describng work functions for new experts													
B. Design of monitoring programme													
B.1.1.Evaluate existng measurement sites													
B.2.1 Select monitoring sites for air quality measurements													
B.2.2 Define site characteristics													
B.2.3 Assess emission sources													
B.2.5 Select sites for meteorological measurements													
B.2.6 Specify meteorological data													
B.2.7 Specify use of existng equipment													
B.2.8 Establish agreements with site owners													
B.2.9 Input to future activities													
C. Procurement, equipment, hardware and software													
C.1.1 Evaluate existing equipment													
C.1.3 Assist in selecting equipment for RefLab													
C.2.1 Procure instruments and equipment													
C.2.2. Prepare instruments for installation													
D. Data management													
D.1.1 Specify data collection/data transfer													
D.1.2 Specify data retrieval and local database at Mon Lab													
D.1.3 Specify data quality check and control procedures													
D.1.4 Identify sources of supplementary data													
D.2.1. Prepare database for manual data (seq. & hivol.)													
D.2.2. Establish local data base for monitoring data at MonLab													
E. Training													
E.1.1 Assess training needs for phase 2													
E.2.1 Prepare on-the-job training													
E.2.2. Prepare training programme for instrument calibration etc.													
E.2.3. On-the-job training at RefLab and at MonLab													
E.2.4. Support training at Reference Laboratory													
E.3.1. Training in English and Computer applications													
E.4.1. Training seminar													
F. QA/QC													
F.1.2. Appoint QA/QC responsible officer													
F.2.1 Specify instrument calibration procedures													
F.2.2 Design QA/AC procedures at monitoring labs.													
F.2.3. Establish Standard Operational Procedures as part of QA/QC.													
F.3.1. QC and calibration routines as part on on-the-job training.													

?

**EIMP Air Pollution Monitoring Programme
Annual Plan of Action 1997**

ACTIVITY	month	1	2	3	4	5	6	7	8	9	10	11	12
G.1.1 Prepare plan of action for 1998													
G.2.1. Specify sampling programme procedures													
G.2.2. Specify monitoring programme and data retrieval													
G.2.3. Start monitoring programme and data retrieval													
G.3.1. Establish monitoring station infrastructures in Cairo and Alex.													
G.3.2. Establish first monitors in Cairo and Alexandria													
G.4.1. Data retrieval and data evaluation													
G.4.2. Data presentations													
H. Reference Laboratory													
H.1.1. Installation of monitors at Reference Laboratory													
H.1.2. Calibration of monitors initiated													
H.2.1. Training RefLab personnel in use of monitors and calibration													

EIMP Air Quality Monitoring Staff	1	2	3	4	5	6	7	8	9	10	11	12	Total
Bjarne Sivertsen													5
Leif Marsteen													6

 Home office extra time
Dr. Nasar to NILU in August

Preliminary estimate
1998 activities



Activity	1	2	3	4	5	6	7	8	9	10	11	12
A. Institutional support												
A.1.1 working group				■								■
A.2.1. contract with mon.lab												
B. monitoring programme												
B.2.1 Select sites				■								■
B.2.2 Define site characteristics				■								■
B.2.7 existing equipment			■									
B.2.8 agreements site owners	■	■	■	■								
B.2.9 Input to future activities												■
C. Procurement,												
C.2.1 Procure equipment	■	■	■	■								
C.2.2. Prepare instruments	■	■	■	■								
D. Data management												
D.1.1 Specify data collection	■	■										
D.1.2 Specify data retrieval	■	■										
D.1.3 Specify data quality check	■	■										
D.1.4 sources of suppl. data				■								
D.2.1. database from samplers				■	■	■						
D.2.2. local data base at ML	■											
E. Training												
E.2.1 on-the-job training	■	■	■	■	■	■					■	■
E.2.2. training in calibration	■	■										
E.2.3 training at RefLab and MonLab	■	■	■	■	■	■						
E.2.4. Support training RefLab	■											
E.4.1. Training seminar												
F. QA/QC												
F.2.2. QA/QC procedures												
F.2.3 S O P as part of QA/QC.	■	■	■	■								
F.3.1. QC and calibration routines	■	■	■	■								
G.1.1 Prepare action plan 1999												■
G.2.1. Specify sampling procedures			■	■	■							
G.2.2. Specify monitoring programme												
G.2.3. Start monitoring programme	■	■	■	■	■							
G.4.1. Data retrieval and data evaluation	■	■	■	■	■	■	■	■	■	■	■	■
G.4.2. Data presentations			■	■	■		■			■	■	
H. Reference Laboratory												
H.2.1. Training RefLab personnel	■											

EIMP Air Quality Monitoring Staff		Total 1998 M-months
Bjarne Sivertsen	1 1	3
Leif Marsteen	1 1 1 1 1	7

**Air Pollution Monitoring
Status March 1997**

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12	Plan	Actual	Weight	Plan*Weight	Actual*Weight	
A. Institutional support																		
A.1.1 Air pollution monitoring working group														0%		1%	0%	0%
A.2.1 Assist with technical input to contract with monitoring lab													50%	0%		1%	1%	0%
A.2.2 Assist in describing work functions for new experts													30%	10%		1%	0%	0%
B. Design of monitoring programme																		
B.1.1 Evaluate existing measurement sites													30%	10%		2%	1%	0%
B.2.1 Select monitoring sites for air quality measurements													10%	10%		1%	0%	0%
B.2.2 Define site characteristics													0%	0%		2%	0%	0%
B.2.3 Assess emission sources													0%	0%		1%	0%	0%
B.2.5 Select sites for meteorological measurements													0%	0%		1%	0%	0%
B.2.6 Specify meteorological data													0%	0%		1%	0%	0%
B.2.7 Specify use of existing equipment													0%	0%		1%	0%	0%
B.2.8 Establish agreements with site owners													10%	10%		2%	0%	0%
B.2.9 Input to future activities													0%	0%		1%	0%	0%
C. Procurement, equipment, hardware and software																		
C.1.1 Evaluate existing equipment													30%	10%		1%	0%	0%
C.1.3 Assist in selecting equipment for Ref.Lab													50%	30%		1%	1%	0%
C.2.1 Procure instruments and equipment													100%	70%		2%		
C.2.2 Prepare instruments for installation													20%	0%		2%		
D. Data management																		
D.1.1 Specify data collection/data transfer													0%	0%		2%	0%	0%
D.1.2 Specify data retrieval and local database at monitoring lab.													20%	0%		2%	0%	0%
D.1.3 Specify data quality check and control procedures													20%	0%		3%	1%	0%
D.1.4 Identify sources of supplementary data													0%	0%		1%	0%	0%
D.2.1 Prepare database for manual data (seq. & hivol.)													0%	0%		2%	0%	0%
D.2.2 Establish local database for monitoring data at monit. lab.																4%		
E. Training																		
E.1.1 Assess training needs for Phase 2													30%	10%		1%	0%	0%
E.2.1 Prepare on-the-job training programme													20%	10%		3%	1%	0%
E.2.2 Prepare training programme for instrument O&M													30%	0%		1%	0%	0%
E.2.3 On-the-job-training at Ref. Lab and monitoring lab.													10%	0%		6%	1%	0%
E.2.4 Support training at Reference Laboratory													40%	0%		2%		
E.3.1 Training in English and computer applications													30%	0%		1%		
E.4.1 Training seminar													80%	0%		1%		
F. QA/QC																		

Appendix F

AirQUIS

- a) EIMP emission inventory data base
- b) Proposal

a)

27 May 97

Text from DRC for EIMP Proposal for Staff Schedule and Budget Revision

2.4 Air Pollution Monitoring

The air pollution specialist input in the operation phase is reduced, as more substantial support is proposed under a twinning-type arrangement.

It is proposed to install NILU's AirQUIS air quality information system (a GIS-based software package) at EEAA for management and analysis of both air quality data from the monitoring programme, and also air emissions data from the EIMP Pollution Sources Database component. An additional air pollution specialist has been included for implementation and training for ambient air quality data with AirQUIS.

2.5 Point Source Database and Monitoring

A significant increase in input is required for this component.

A larger training effort is needed for emissions and wastewater monitoring at TIMS. This has necessitated addition of a wastewater sampling specialist, and a substantial input from an air emission measurement specialist. TIMS does not have an active wastewater monitoring programme, but TIMS has now assembled a monitoring team with little measurement experience for the EIMP project. This means that training for wastewater monitoring must start from the beginning, rather than just to implement quality control procedures in an existing measurement programme, as had been anticipated based on the Project Document.

TIMS has only one experienced specialist in air emissions monitoring, and only with measurements of particulates. The new instrumentation provided by EIMP includes manual gas sampling, and automatic emission gas analysers, which have not been used at TIMS before. TIMS has also hired new staff for the air emissions monitoring, who will need formal and on-the-job training in basic techniques over a longer period than originally anticipated. The necessary level of technical training requires a specialist in the measurement techniques.

Initial visits to two of the large industries selected for EIMP monitoring by the Working Group on Point Source Monitoring have indicated that these are not suitable for point source monitoring, due to large diffuse emissions that cannot be measured by stack sampling, and some difficulties with wastewater sampling. Other selected industries are likely to have similar problems. This will necessitate additional expatriate effort in advanced inspection and selection of industries suitable for point source monitoring with the equipment provided by EIMP.

Major setbacks to development of the point source database were encountered in Phase 1. Appointment of the EEAA counterpart specialist for pollution

sources was appointed at the very end of Phase 1. Although a significant share of the input for this component had been committed to Phase 1, there was no EEAA staff to train and assist in the development of the point source database.

Problems were also encountered with the two institutions proposed as data providers in the Project Document. FEI was in the process of reorganisation of its environmental committee in 1996, and was not ready to start the project with EIMP. It was discovered late Phase 1 that GOFI no longer had responsibility for public industries, resulting that GOFI was removed from consideration as a primary data provider by the Steering Committee. Both institutions would also need substantial training and supervision input for their roles as data providers to the EEAA point source database.

FEI remains a potential data provider, and two other institutions were identified as potential data providers during Phase 1, but no agreements were reached. A considerable additional effort is still required to establish contracts with institutions to provide data, and to provide initial training, supervision and quality control of their work.

It is proposed to modify the original scope of the point source database. The Project Document defines the point source database to include air emissions, wastewater emissions and waste. Quite a few other institutions than EEAA have responsibility for water quality and wastewater, and are in the process of developing database systems that will include wastewater discharges from point sources (National Water Research Center, and Cairo General Organisation for Sanitary Drainage). Projects dealing with municipal waste and hazardous waste are also underway or being planned. No other organisation than EEAA has responsibility for air quality or air emissions, however.

It is therefore proposed to concentrate efforts in the EIMP Point Sources database on establishing and making use of a database for air emissions (emission inventory). A simple database for wastewater samples will be established by EIMP, but the effort on wastewater will focus on cooperation with other institutions developing water quality and wastewater databases. Efforts to collect wastewater data will be limited to sites monitored by TIMS, and sites discharging to coastal waters, which are relevant to the EIMP Coastal Water Monitoring component. It is proposed that the database not include data on waste generation.

After review of several available air emissions inventory database system, the NILU AirQUIS air quality information system database has been selected for implementation at EEAA. This software system has been developed for international use by NILU, and includes air emission data management for point sources, a data management for ambient air quality data. AirQUIS is a GIS-based system which enables geographic analysis of the emissions and ambient air data, with substantially more capabilities and user-friendliness than other emissions databases. Availability of this software system would enable EEAA to more quickly attain its unique leading role in air quality management in Egypt.

To support implementation of the AirQUIS system, an AirQUIS emission inventory specialist, and an AirQUIS system specialist has been added to the team, in order to customise the AirQUIS software system for Egyptian requirements, and to plan, train and supervise the development of the emissions inventory.



b)

PROJECT PROPOSAL

Date : Kjeller. 1 April 1997
Ref. : ARi/P-822
Author : Atle Riise

Installation of AirQUIS Modules for use in the EIMP Project

1. Introduction

COWI has asked NILU to prepare a proposal for establishing parts of the AirQUIS (Air Quality Information System) in connection with the EIMP project. The EIMP project and the AirQUIS system were both presented in some detail at a meeting between NILU and Douglas Clark from COWI. A brief outline of AirQUIS will be given here.

AirQUIS is developed for air quality surveillance and planning, and includes:

- module for data acquisition and quality control
- manual data entering application
- data base for storing measured data
- data base for storing emission inventories
- emission models
- dispersion models
- population exposure models
- statistical tools and graphical presentation tools
- An user friendly interface including an integrated GIS (Geographical Information System) interface

A schematic presentation of the system is given in Figure 1.

AirQUIS constitutes the air pollution part of ENSIS (Environmental Surveillance and Information System). ENSIS also contains a corresponding module for water quality called WaterQUIS (Water Quality Information System). It should be discussed whether WaterQUIS could be used as a discharge inventory and water quality information system in the EIMP project.

Vennligst adresser post til NILU, ikke til enkeltpersoner. Please reply to the institute.

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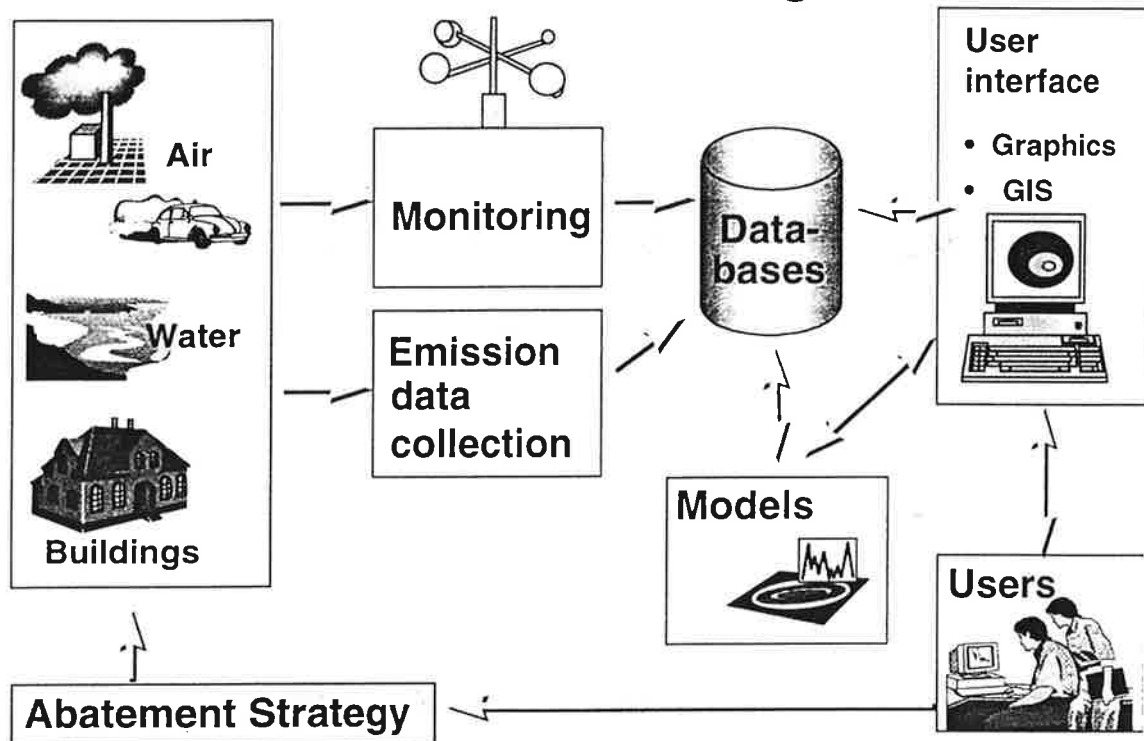


Figure 1: A simple sketch of the ENSIS system

2. Scope of Work

2.1 An overview

COWI has asked NILU for a price quotation for a data base for storing point source emission data. This includes the AirQUIS company registers and functionality for storing, editing and reporting data for the various industrial processes, cleaning devices and stacks at any number of industrial sites. All relevant geographical locations and physical dimensions of the stacks are stored, as well as any consumption, production and/or measured emission data. The integrated GIS user interface will further enhance the user friendliness of the system, as well as its reporting possibilities. Simple emission models may be included to calculate total emissions in a selected area.

As there is also a need for storing ambient air quality data at the EEAA, we propose that the AirQUIS measurement data base be used for this purpose. This data base is an integrated part of AirQUIS, and is running under the same user interface as the emission database discussed above. This solution will save the users from having to relate to two different systems, and will provide them with the opportunity to present measured data and emission data with the same functionality. Financially it is reasonable to choose this integrated solution, as the installation costs should be less than that of two separate applications.

NILU also proposes that the ENSIS manual data entering application should be a part of the EIMP AirQUIS installation. This is a useful tool for entering data that are not electronically

available, in an efficient and secure manner. Such data may be e.g. point source data or measured data.

In this document, we propose to install the following modules under the EIMP project:

- manual data entering application
- data base for storing measured data
- data base for storing emission inventories for point sources
- emission models
- user interface including integrated GIS

The emission inventory data base may of course be expanded to include area distributed data and traffic data. This is, however, not included in the present proposal.

This proposal includes the installation of AirQUIS on one computer only. This computer may function as an application server, serving client installations on other computers in the EEAA internal network. If such client installations are desired to make the system more available to the EEAA staff, the associated time costs and licenses should be discussed before a final agreement can be made.

In addition to installation of the above mentioned software, the proposed work includes the 'on site' training of project personnel as well as any necessary software customising to comply with given formats on input data. Also, an automatic functionality for on line transfer of measured data from the data acquisition system must be customised to communicate with the measurement data base.

The ENSIS data acquisition module is not included in this proposal. If, however, this should be chosen as a tool for data collection and quality control, this would facilitate the communication between the data acquisition data base and the measurement data base at the EEAA.

2.2 The Project Tasks

The various tasks of the proposed work is specified in further detail below. The work includes the installation of a β -version of the system before the installation of the final AirQUIS 2.0 version, containing the modules specified above. This is due to the urgency felt in the project to install and get familiar with the system, and to the time schedule for the ongoing AirQUIS development. A fully quality assured version of AirQUIS 2.0 will be delivered according to the time schedule given below.

1. Establishing the EEAA AirQUIS 2.0 installation on a PC at NILU.

This includes customising and testing of an AirQUIS 2.0 β -version to meet special needs concerning import and export of point source data and measured data.

It also includes the application of base maps, territorial units, demographic data and other geographical data that EIMP may provide prior to the work in this task.

NILU wish to purchase the PC in question, and its price is included in the proposed budget.

2. Installation of the AirQUIS 2.0 β -version at the EEAA.

The PC on which the system is installed will be installed as an application server at the EEAA.

A test of the β -version will be performed upon installation to identify any problems. If practical, any problems will be corrected at this point.

3. Training of EEAA personnel.

It is assumed that key personnel will take part in the installation of the system, so that this will constitute a part of the 'on the job' training. The training sessions will deal with both relevant theory and practical use of the system.

4. Installation of AirQUIS 2.0 (Final version) at EEAA.

Performance of the AirQUIS Site Acceptance Test (SAT). This task will terminate in EEAA's official acceptance of the AirQUIS installation.

5. Further Customising.

There may arise a need to modify AirQUIS further to sustain local systems beyond basic data import or export. In this case, NILU will provide the necessary resources up to one man month.

3. Time schedule

This section describes a proposed time schedule for the tasks that are described in section 2.2.

Table 1: Time Schedule

Task	Task Description	Man weeks	Task end date
1.	Establishing the EEAA AirQUIS 2.0 installation on a PC at NILU	2	19.09.97
2.	Installation of the AirQUIS 2.0 β -version at the EEAA	5	18.10.97
3.	Training of EEAA personnel	1	25.10.97
4.	Installation of AirQUIS 2.0 (Final version) at EEAA.	2	19.12.97
5.	Further Customising	Up to 4	1.6.98

20.10 → 21.12

3 months

4. Budget

The cost estimates related to the proposed work is specified in this section. It includes costs for purchasing of hardware and some of the necessary third party software. It also includes the AirQUIS license and maintenance agreement costs, as well as cost associated with work and travels. All costs are summarised in the Table 2:

The licenses described are 'site licenses', valid for the EEAA. That is, the software can be used by the specified number of user at any one time, disregarding the number of computers at the EEAA on which it is installed.

The sums in Table 2 includes the licenses and installation costs of the Measurement Data Base and its User Interface. It also includes the Manual Data Entering Application. Removing these modules from the offer would result in a total cost of NOK 390.000,- keeping the proposed time schedule otherwise unchanged.

Table 2: Budget (based on 1 DAK = 1.0365 NOK). The license for “Point Source Emission Data base” is valid for the part of the Emission Data base that concerns Point source emissions only.

	Costs (1000 DAK)
Hardware:	
	One Pentium Database Server 40
	Total, Hardware 40
AirQUIS PC server license: (First license)	
	Manual Data Entering Application 20
	Measurement Data base 20
	Point Source Emission Data base 30
	User interface including integrated GIS for one simultaneous user 45
	Total, First License 115
Licenses for other software that NILU will provide	
	Oracle, one license for up to eighth simultaneous users. 19
	Total, Other software licenses 19
Work:	
	Task 1 55
	Task 2 130
	Task 3 25
	Task 4 55
	Total, Time costs 265
Travel:	
	First visit. Travel for 2 persons, Subsistence for 6 man weeks. 78
	Second visit. Travel for 2 persons. Subsistence for 2 man weeks. 35
	Total, Travels 113
Sum:	552

In addition to the above sum, there are costs related to any work under the optional Task 5. These will be charged for the actual number of work hours needed to perform the task. The upper limit is NOK 106.000,-, which corresponds to one man month. Travel costs and subsistence associated with any necessary visits to Egypt by NILU personnel in connection with this task will be charged in addition to the above sums. In this case, the Norwegian state's standard rates apply for subsistence.

For installation on additional PCs, the licenses are priced as follows: License number 2 is 50% of license number 1. Additional licenses are 25% of license number 1.

A Maintenance Agreement must be discussed. Annual maintenance for each module cost approximately 20% of the module license cost, with a minimum of NOK 20.000,-. This should cover assistance per telephone and/or Internet, and the hourly rates for work performed by NILU personnel in Norway or in Egypt. If a visit to Egypt is necessary for maintenance, the associated travel costs and subsistence will be covered by EIMP. This scheme is merely a first suggestion and must be discussed further to yield a formal Maintenance Agreement between the parties.

This budget does not include costs related to the purchase or installation of any necessary third party software other than that mentioned in Table 2.

The cost estimate is based on NILU's prices for the year 1997. NILU adjusts its prices every year from 1st January. For work carried out after the turn of the year, an increase in the prices must be expected.

5. Assumptions

The estimates of time consumption and costs in this proposal is given on the basis of the following assumptions:

- COWI will provide format specifications and data input example files for data import design and testing.
- Input data files are on an ASCII format.
- There is only one format for point source input data, and one format for measured input data.
- The selected data acquisition system will be specified so that constructing a data transfer between this system and the AirQUIS installation at the EEAA is straight forward.
- Input data are in English.
Geographical data are delivered in a format that NILU can handle without having to do any conversions. Examples of suitable files are Shape files or files on ArcInfo format.
- The existing hardware and software at the EEAA satisfy the technical specifications given in section 6.
- No work will be performed by NILU personnel in connection with installing, configuring or supporting any necessary hardware or software that are not included in Table 2.

The following assumptions are only relevant if the Measurement Data Base is to be installed:

- If the selected Data Acquisition System is not the ENSIS Data Acquisition System the import of measured data from this system is from ASCII files. The format of these files will be specified so that constructing a data transfer between the Data Acquisition System and the AirQUIS installation at the EEAA is straight forward. Examples of these files are provided so that NILU can test the transfer functionality in Norway during Task 1.
- The Data Acquisition System is such that all measured and administrative data are stored in one place and in a self consistent manner, that is, all data of the same type is stored in the same way.

The data structures of all input data, and the configuration and communication possibilities of the Data Acquisition System, must be known before a final cost estimate can be made.

6. Technical Specifications

This section describes the hardware and third party software that must be purchased and installed by EIMP personnel prior to the AirQUIS installation. The costs of these items are not included in the budget of this proposal.

Table 3: Technical Specifications

Hardware/Software	Specifications
Network communication at the EEAA	<ul style="list-style-type: none"> • 10 Mbits Ethernet • Twisted Pair Cabling • TCP/IP protocol • There are only computers running Windows operative systems in the network.

Appendix G

Air Quality Monitoring Programme for Egypt

EIMP Air Quality Monitoring Programme

Location of instruments

Site name	Area type	Monitors						Samplers								
		SO ₂	NO ₂	PM	HC	O ₃	CO	Met	PM	TSF	VO	SO ₂	NO ₂	DF	PS	TF
Greater Cairo area																
1 El Gemhoroya street	Street canyon	1	1	1	1		1									
2 Ain Shams University	Urban / Res.	1	1					1								
3 Embaba police station	Road side		1		1		1		1							
4 Cairo city centre	Urban centre	1	1	1		1	1									
5 Nasr City	Residential								1		1	1				
6 Shoubra el Kheima.	Industrial	1		1						1		1	1			
7 Maadi(police station)	Residential	1	1						1							
8 Tabbin	Industrial	1	1	1				1		1					1	
9 Tabbin south	Industrial								1		1				1	
10 Giza, Cairo University.	Residential	1	1		1			1								
11 Giza pyramid	Regional										1	1	1			
12 Abu Zabel	industrial														1	1
Alexandria																
13 Abu Keir College	Industrial	1	1								1	1			1	
14 El-Max Petrogas	Industrial									1		1	1	1	1	
15 IGSR, Alex University	Urban/road side	1	1	1	1		1	1								
16 El-Asafra-El Azhar Univers.	Residential	1		1												
17 Gheat El-Inab school	Residential								1		1	1				
18 NIOF	Outside city						1									
Delta																
19 10 Ramadan	resid./ind									1		1			1	
20 6 October	industrial/ res.									1		1	1			
21 Damanhur	industrial/res	1													1	1
22 Kafr el Zayat	industrial/res	1	1												1	
23 ElMahalla El Kubra	industrial/res.	1		1											1	
24 El Mansura	industrial/res.	1	1								1				1	
25 Damyat	resid	1						1		1					1	
26 Tanta	urban											1				1
Canal area																
27 Suez	industrial/res.	1	1												1	1
28 Port Sald	Residential															1
29 Ismailia	residential	1														1
Upper Egypt																
30 El Fayum	resid./ind											1			1	1
31 El Minya	Res./ Industrial									1					1	
32 Nag Hammadi	industrial/res											1				1
33 Assyut	industrial/ res.	1	1					1		1					1	
34 Assyut 2	residential/urban															1
35 Kom Ombo	industrial														1	
36 Idfu	Indusatrial/res.														1	
37 Aswan	Industrial/ res.														1	
38 Luxor	residential	1				1		1							1	1
39 Sharm ElSheik	background					1										1
Monitoring Laboratory		1	1	1	1	1	1	1	1	1	1	1	1			
Reference Laboratory		1	1	1	1	1	1				1	1	1			
Instruments total		21	15	9	6	6	6	8	11	5	5	12	7	20	6	9
Instruments from other inst		1	1		1	1	1	1								
Total required		20	14	9	5	5	5	7	11	5	5	12	7	20	6	9
Totally to be purchased?		18	14	9	5	7	5	7	10	5	5	12	7	9	0	0

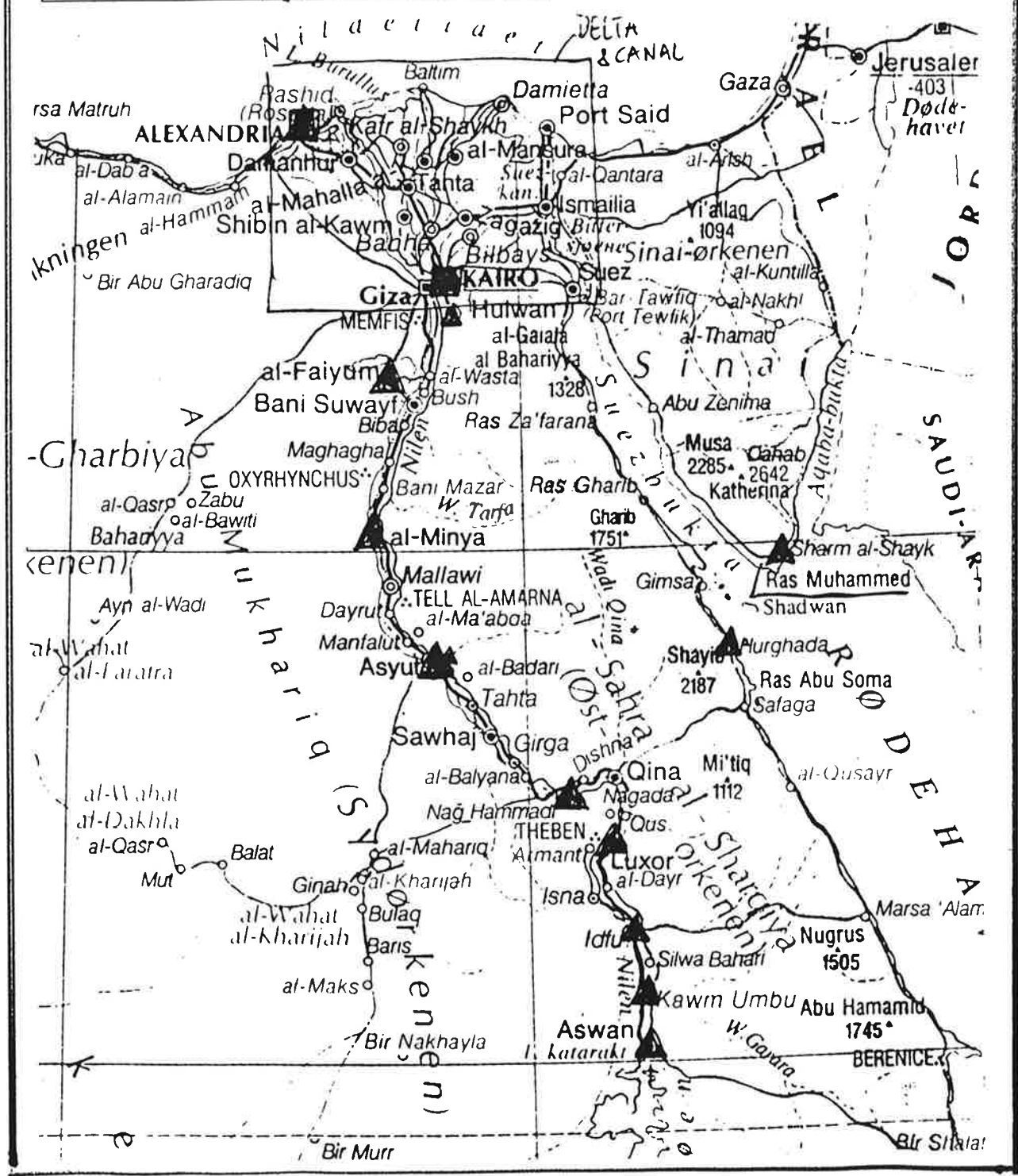
Extra instruments needed

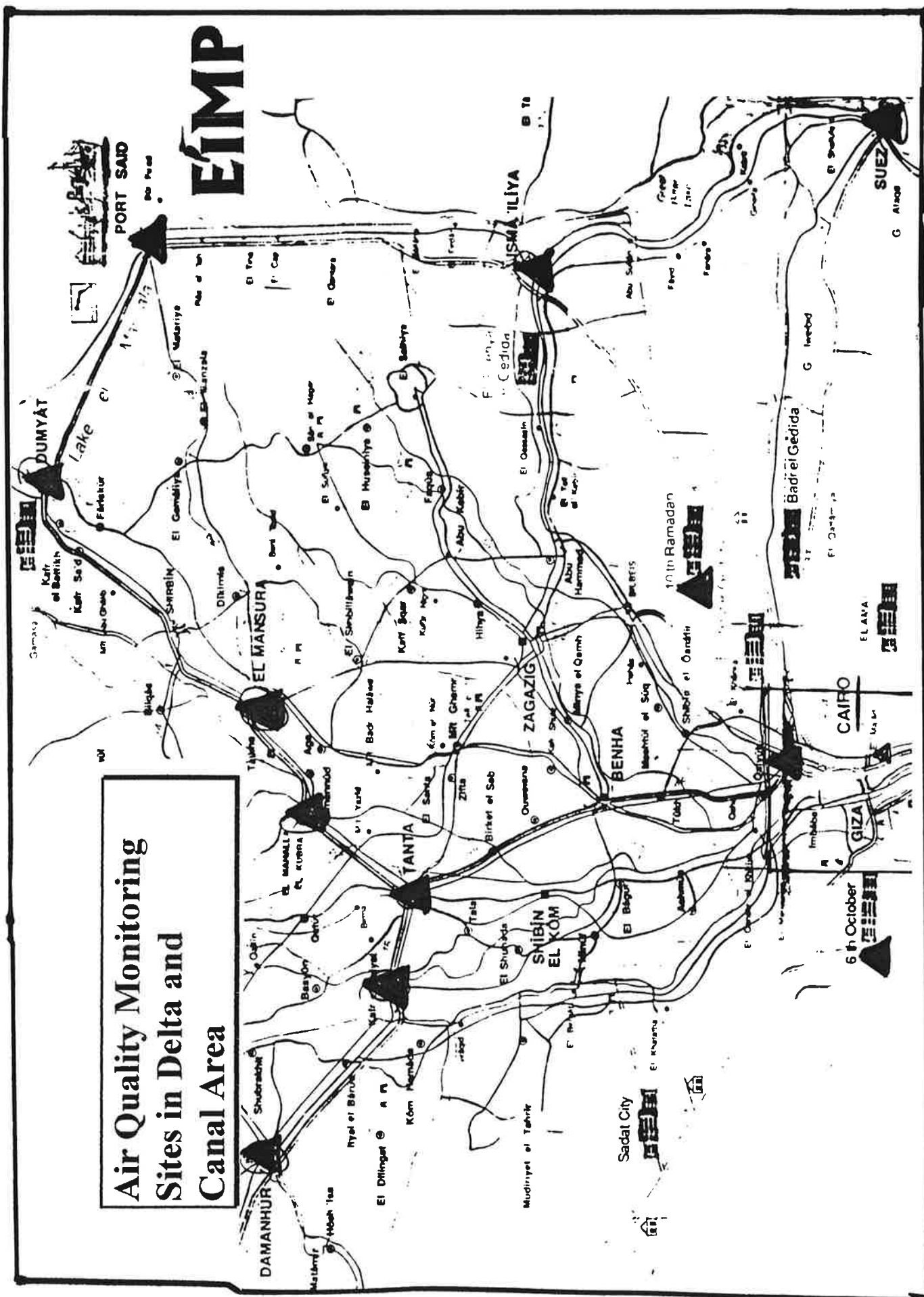
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Air Quality Monitoring Sites in Egypt

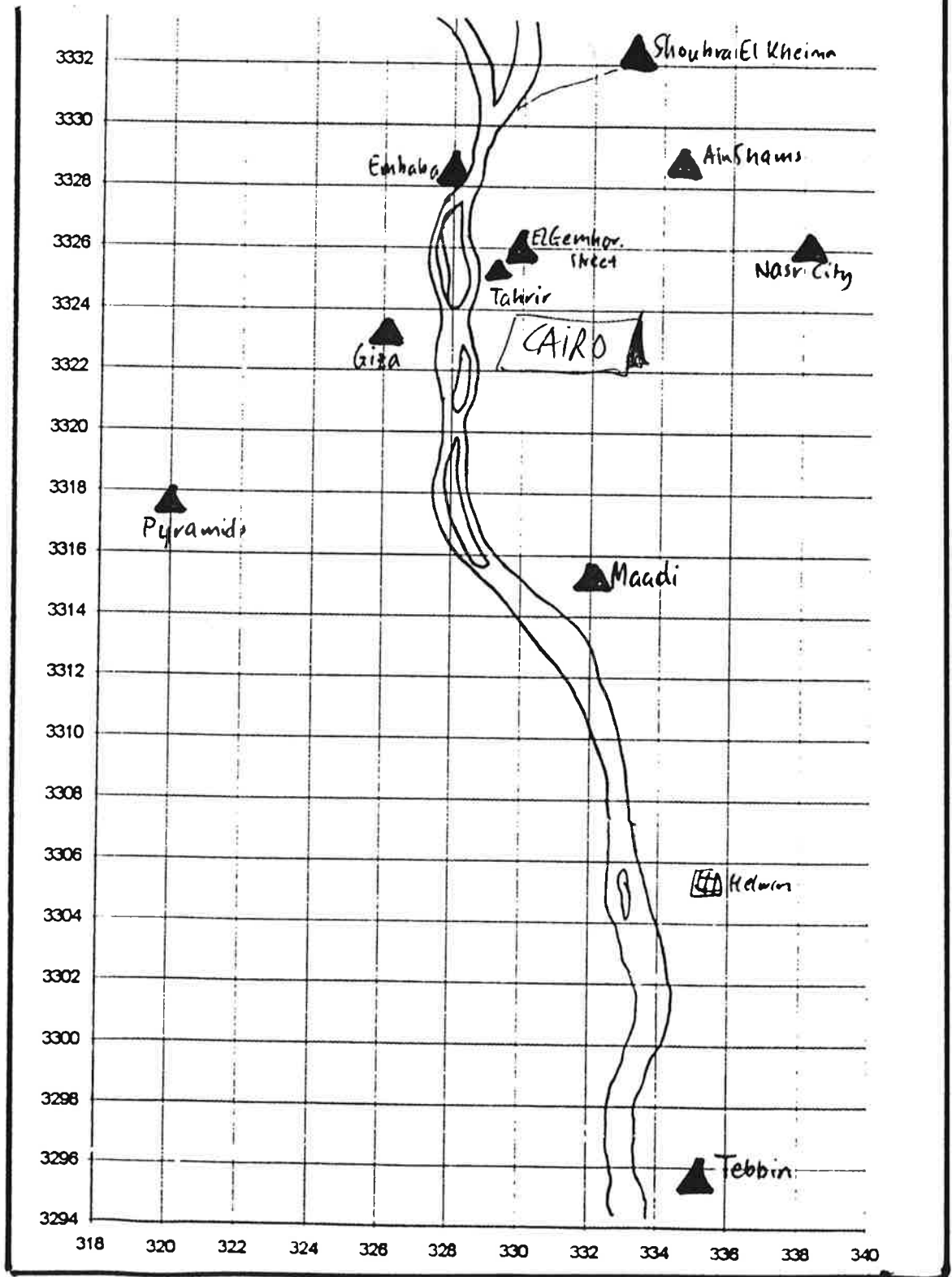
See separate maps for Canal area
Cairo
Alexandria





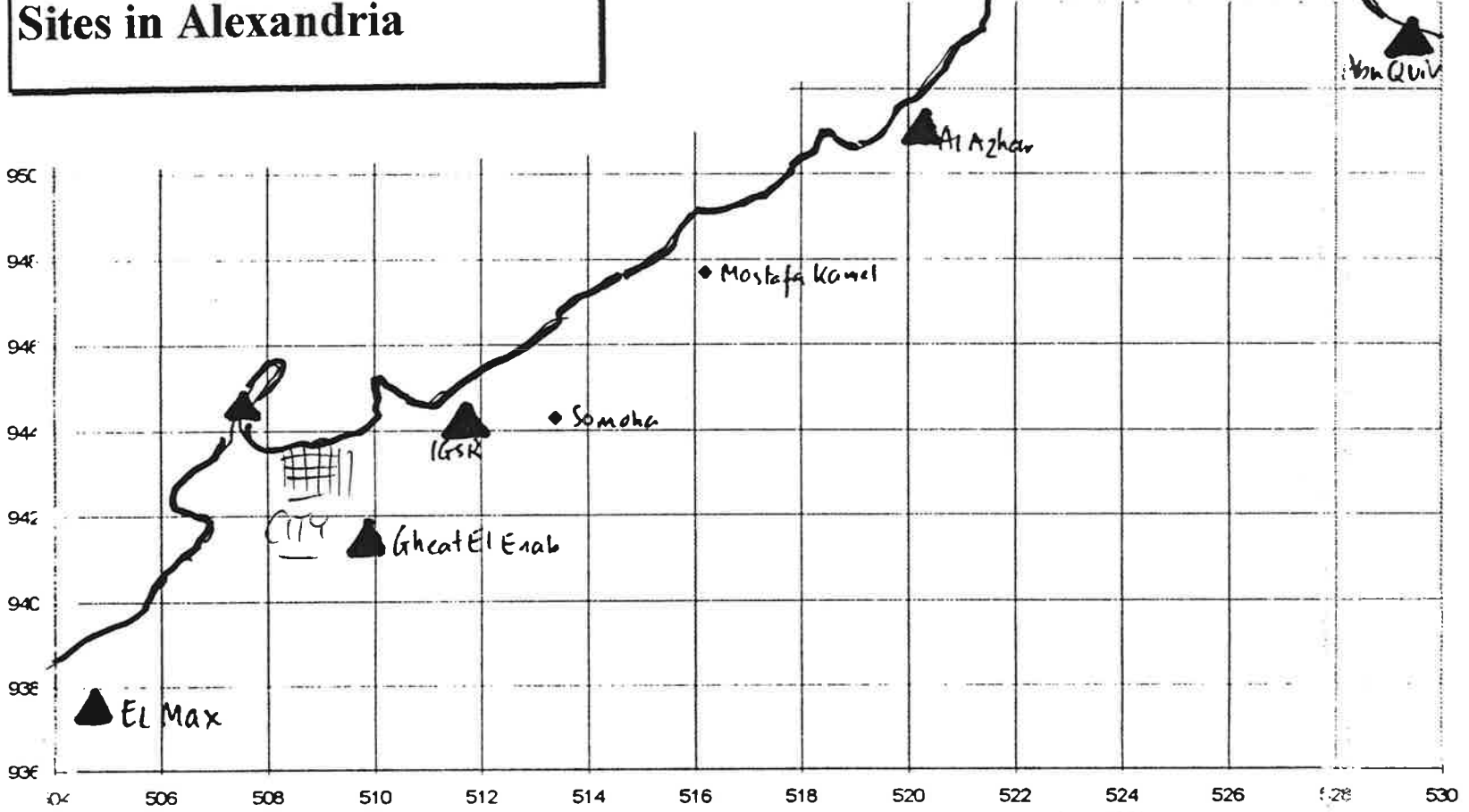


Air Quality Monitoring Sites in Greater Cairo area



Air Quality Monitoring Sites in Alexandria

EIMP



Appendix H

Training programme at NILU

- a) Task manager counterpart
- b) Reference Laboratory, counterpart



Environmental Information
and Monitoring Programme
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 378 5137, Fax: 202 378 5478

Note

To: Jan Hassing
Copy: Dr M Nasar
From Bjarne Sivertsen
Date: 25 April 1997

Air Quality Monitoring Programme Visit to NILU for training purposes.

An important part of the Air Pollution Monitoring Programme will be to establish a clear understanding of the necessary daily follow up and quality control which all data collected will have to undergo. One key person in the establishment of the monitoring sites, the development of network and supporting the initiation phase of this programme will be the Task Manager Counterpart Dr Mohammed Nasar.

As an important part of his training programme we have included a visit to the Norwegian Institute for Air Research (NILU) at Kjeller, Norway. The purpose of this visit will be to :

- be introduced to the air pollution work undertaken at NILU,
- participate in a typical days work at NILU,
- visit monitoring sites,
- discuss quality assurance and quality control with responsible key personnel,
- study sample preparation and analyses,
- discuss laboratory procedures and controls.

A visit to the Norwegian Pollution Control Authorities will also be part of the programme.

The visit has been planned to take place from Monday 4 August and will be terminated on Friday 15 August 1997.

Flight tickets and arrangements at NILU will have to be verified no later than 15 June 1997. Please confirm as soon as possible that funds will be made available for travel and accommodation for Dr. Nasar.

NILU will have to charge an estimated 50% of the total time spent during the visit at NILU. The costs estimated for this time spent by scientific personnel during training and discussions with Dr. Nasar amounts to about 20 000 DKK.

Looking forward to your reply.



**Visit to NILU by Dr Mohammed Nasar, EEAA Cairo Egypt
4 to 15 August 1997.
Air quality Monitoring and Surveillance
Training programme**

Introduction

An important part of the EIMP/EEAA Air Pollution Monitoring Programme to be established for Egypt, will be to establish a clear understanding of the necessary daily follow up and quality control which all data collected will have to undergo. One key person in the establishment of the monitoring sites, the development of network and supporting the initiation phase of this programme will be the Task Manager Counterpart Dr Mohammed Nasar.

As part of his training programme we have included a visit to the Norwegian Institute for Air Research (NILU) at Kjeller, Norway. The purpose of this visit will be to :

- be introduced to the air pollution work undertaken at NILU,
- participate in a typical working day at NILU,
- visit monitoring sites,
- discuss quality assurance and quality control with responsible key personnel,
- study sample preparation and analyses,
- discuss laboratory procedures and controls.

A visit to the Norwegian Pollution Control Authorities will also be part of the programme.

The visit has been planned to take place from Monday 4 August and will be terminated on Friday 15 August 1997.

Proposed programme

4 August 1997

1115 Arrival Fornebu

Fagerborg hotel (okay)

2000 Dinner, introduction to programme (BS/LM)

5 August 1997

- 0900 Arrival NILU, Welcome address, introduction(OEH)
0915 Presentation of NILU
0945 The modern air pollution monitoring and surveillance programme
1000 Coffee
1030 Presentation of AirQUIS, (A Riise/ T Bøhler):

1200 Lunch
1230 AirQUIS (continued)
1500 Questions
1530 End

6 August 1997

- 0900 Air quality indicators
What do we measure and why? (BS/ JEH)
1000 Coffee
1030 Instruments (samplers and monitors) (LM)
1130 Lunch
1230 Visit to the NILU site (container, indoor station, samplers etc.) (LM)
1400 Computer room, Data retrieval and quality controls.
1430 Quality assurance ,
Data storage, data bases
1530 Questions

7 August 1997

- 0900 Chemical analyses
Introduction to the Laboratory (OAB ++)
1000 Coffee
1030 Inorganic analyses (OR ++)
-passive sampler, preparation and analyses (?)
-SO₂ and NO₂ analyses (?)
-NILU use of Ion chromatographs.
1130 Lunch
1230 Inorganic analyses continued...
1530 Questions

8 August 1997

- 0900 Further on samplers and inorganic analyses
heavy metals
ICPMS (OR)
1000 Coffee
1030 Organic analyses (OAB)
1100 Practical participation
1130 Lunch
1230 Site visit , Field station (Hurdal)
1600 Return Lillestrøm

11 August 1997

- 0900 Quality assurance, accreditation (JEH)
- 1000 Coffee
- 1030 Air pollution statistics (BS)
 - Trend analyses
 - User friendly presentations
- 1230 Lunch
 - NILU reports - a survey

12 August 1997

- 1000 Visit to the State Pollution Control Authority (Oslo)

13 August 1997

- 0900 Preliminary summary of visit
 - Further to be studied....
- 1000 Discussions on practical work
 - the use of monitors and samplers
- 1230 Lunch
- 1330 Practical Laboratory work (L/F)

14 August 1997

- 0900 The complete surveillance programme
- 1000 Coffee
 - The presentation of data
 - Annual reporting
- 1100 NILU as international co-ordinating centre (EMEP) (JAS)
- 1230 Lunch
 - Development of report from visit.

15 August 1997

- 0900 Reporting
- 1000 Coffee
 - Reporting
- 1230 Lunch
- 1330 Conclusions and further work in Egypt.

NOTE

To : LM
Copy : OEH, PB, TB, ARi, JEH, TCB, OAB, LIF, OR, SK, HW
From : B Sivertsen
Date : Kjeller, 25 July 1997
Ref. : O 96013

SUBJECT: Visit by Sherif Hassan, EIMP Egypt

The EIMP/EEAA counterpart for the Reference Laboratory in Egypt is visiting Denmark (VKI, NERI, DANAK (Accreditation body) + DkTeknik) and Norway (NILU) in August 1997.

He will be at NILU on 28 and 29 August, and Leif Marsteen will be responsible for his visit at NILU. We have suggested the following programme for Dr Hassan:

Wednesday 27 August 1997

2130 Arrival at Fornebu (SK476)
Transport to Fagerborg hotel (LM)

Thursday 28 August 1997 (NILU Training Centre /UB)

0900 Introduction to NILU, work programme (Øystein Hov /Paal Berg)
0930 NILU, Air quality Monitoring systems (Trond Bøhler / Atle Riise)
1000 Coffee
1030 Instrument Laboratory
monitoring stations (Leif Marsteen/Harald Willoch)
data receiving, data QA (LM/Thor C Berg)
1130 Lunch
1215 Instrument calibration and maintenance (LM)
1315 QA officer - Accreditation (Jan Erik Hanssen)
1500 NILU library

Vennligst adresser post til NILU, ikke til enkeltpersoner/Please reply to the institute.

NILU
P.O. Box 100
Instituttveien 18
N-2007 KJELLER, Norway
Telephone: +47 63 89 80 00
Telefax : +47 63 89 80 50
Telex : 74854 nilu n

NILU-Tromsø
P.O. Box 1245
Fiolvegen 15
N-9001 TROMSØ, Norway
Telephone: +47 77 60 69 70
Telefax : +47 77 60 69 71

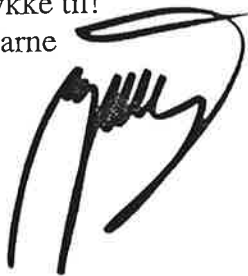
Bank: 5102.05.19030
Foretaksnr./Enterprise No. 941705561

Friday 29 August 1997

- 0830 Introduction to Chemical Laboratories (Ole-Andrers Braathen)
0900 Visit chemical lab. (Oddvar Røyset / Lisbeth Fagerbakk)
-Passive samplers
-sequential sampler
-filter packs / hi-vol samplers
Inorganic analyses
1130 Lunch
1215 Documentation,
Quality insurance and
reporting. (LM, JEH, TB/SK?)
1430 Summary, questions
additional visits??
1500 End

Please check your schedule, and give me or Leif feed-back as soon as possible if you can NOT be available at the given time.

Lykke til!
Bjarne



Appendix I

Scope of services - Reference Laboratory

H Appendix (B2) Scope of services - Reference Laboratory

1 Background

The Environmental Information and Monitoring Programme (EIMP) is a five year programme (1996-2000) sponsored by Danish International Development Assistance (Danida). The Egyptian Environmental Affairs Agency (EEAA) is the executing agency for EIMP. The prime contractor for the EIMP is the consulting company COWI Consulting Engineers and Planners AS (COWI), based in Copenhagen, Denmark. VKI, Denmark and the Norwegian Institute for Air Research (NILU) are participating as sub-contractors for COWI.

One of the five components of the EIMP is the Reference Laboratory for Standardisation and Quality Assurance component. This component seeks to develop the capacity of the appointed reference laboratory in all aspects of quality assurance and in those aspects enabling the reference laboratory to function as an external quality assurance body.

The functions of the reference laboratory are divided into two parts covering water and air, respectively. The present contract covers the Reference Laboratory - Air.

2 Objective

The objectives of the Reference Laboratory are to contribute to the assurance of the quality of the specified analyses, tests and measurements by assisting the monitoring institutions of EIMP in matters concerning quality assurance and quality of measurements, including the provision of external quality control services. The reference laboratory shall also assist the EEAA by providing data on the quality of measurements provided by the monitoring institutions and audits of the activities of the monitoring institutions performed for the EEAA.

The Reference Laboratory shall make the expertise it has acquired through the reference laboratory activities available to all relevant parties at the expense of the said parties.

3 Overall activities - Air

3.1 Operational Tasks

The reference laboratory will carry out the following activities:

- evaluation of measurement methods, providing information on method performance to the Client
- assistance to the Client in preparation of requirements for data quality
- participation in drafting and evaluation of new standard measurement methods
- performance of interlaboratory studies
- calibration of air monitoring equipment
- training of laboratory personnel in the monitoring institutions in quality assurance issues to ensure the needed quality of results, including data validation

- serving as a link between the laboratory community in Egypt and laboratories in other countries, including participation in interlaboratory comparison studies arranged by international bodies or foreign countries
- provision of information on all reference laboratory activities to laboratories and institutions functioning within the defined scope of work
- performance of assessment (audit) of sampling and measurement activities and related quality assurance of laboratories contracted in the EIMP monitoring network. Assessment is performed on behalf of the Client according to international standards agreed upon. Audits may in the beginning include independent check of data validation. Independent check of data validation will terminate latest by the end of 1998.

3.2 Air matrices and parameters to be covered

The activities mentioned in section 3.1 relate to the monitoring institutions' sampling and measurement for the following environmental matrices and parameters:

- I. ambient air:
 - A. Sulphur dioxide, nitrogen oxides, carbon monoxide, ozone, lead, hydrocarbons, total suspended particulate matter, particulate matter less than 10 μm (PM_{10})
- II. air emissions:
 - A. Gas analysers (CO , CO_2 , O_2 , SO_2 , NO_x , total hydrocarbons)
 - B. Filter samples (particulate matter, PM_{10})
 - C. Wet chemical samples (HF , HCl , NH_3 , SO_2 , NO_x , HCN , Cl_2 , H_2O , H_2S , polyaromatic hydrocarbons)
 - D. Heavy metals in particulate matter (Pb , Zn , Cu , Cd , Ni , Cr , Mn)
 - E. Gaseous heavy metals (Pb , Zn , Cu , Cd , Ni , Cr , Mn)

3.3 Overall plans

The plans for 1997 are covered by section 4 and related appendices, and reflect the fact that the Reference Laboratory is in the process of implementation. For 1998 the preliminary plan is to cover the following types of quality assurance activities:

- assistance in preparing data quality requirements
- interlaboratory studies as proficiency tests
- periodical calibration of air quality monitors
- calibration check of air quality monitors in the field
- calibration of air samplers
- measurement assistance
- publication of newsletter
- assessment of sampling, measurement and related quality assurance activities at monitoring institutions

The activities in 1999 and 2000 will consist of a consolidation of the activities started in 1997 and 1998 and will also include a response to specific measurement problems of a general nature which may arise.

4 Overall activities - Water

4.1 Operational Tasks

The reference laboratory will carry out the following activities:

- evaluation of measurement methods, providing information on method performance to the Client
- assistance to the Client in preparation of requirements for data quality
- participation in drafting and evaluation of new standard measurement methods
- performance of interlaboratory studies
- training of laboratory personnel in the monitoring institutions in quality assurance issues to ensure the needed quality of results, including data validation
- serving as a link between the laboratory community in Egypt and laboratories in other countries, including participation in interlaboratory comparison studies arranged by international bodies or foreign countries
- provision of information on all reference laboratory activities to laboratories and institutions functioning within the defined scope of work
- performance of assessment (audit) of sampling and measurement activities and related quality assurance of laboratories contracted in the EIMP monitoring network. Assessment is performed on behalf of the Client according to international standards agreed upon. Audits may in the beginning include independent check of data validation. This part of audits will terminate latest by the end of 1998.

4.2 Water matrices and parameters to be covered

The activities mentioned in section 3.1 relate to the monitoring institutions' sampling and measurement for the following environmental matrices and parameters:

Water (fresh surface water, marine water, waste water, industrial waste water, groundwater, drainage water), sediments and biota:

- A. Indicators for general quality (pH, conductivity, suspended and dissolved solids, dissolved oxygen turbidity, total residue, total volatile residue)
- B. Major inorganics (sodium, potassium, calcium, magnesium, iron, manganese, chloride, fluoride, sulphate, alkalinity)
- C. Nutrients (ammonia, nitrate, nitrite, orthophosphate, total nitrogen, total phosphorus, silicate)
- D. Organic matter (biochemical oxygen demand, chemical oxygen demand, chlorophyll a)
- E. Non-specific determinands (oil, grease, detergents, cyanide, phenols)
- F. Trace elements (cadmium, chromium, copper, lead, mercury, nickel, zinc, boron, arsenic)
- G. Specific organic analyses (specified later in the programme)
- H. Bacteriological measurements (total coliform bacteria, faecal coliform bacteria, faecal streptococci)

4.3 Overall plans

The plans for 1997 are covered by section 4 and related appendices, and reflect the fact that the Reference Laboratory is in the process of implementation. For 1998 the preliminary plan is to cover the following types of quality assurance activities:

- assistance in preparing data quality requirements
- interlaboratory studies as proficiency tests
- measurement assistance
- publication of newsletter
- assessment of sampling, measurement and related quality assurance activities at monitoring institutions

The activities in 1999 and 2000 will consist of a consolidation of the activities started in 1997 and 1998 and will also include a response to specific measurement problems of a general nature which may arise.

5 Quality control

Perform quality control of the Reference Laboratory's own activities as described in procedures prepared by the Reference Laboratory according to recognised standards and guidelines, documented in a quality manual.

Appendix J

**Draft Contract with
Monitoring Laboratory (Cairo University)**



Air Pollution Monitoring Project

Appendix A. Scope of Services

1. Background

The Environmental Information and Monitoring Programme (EIMP) is a five-year programme (1996-2000) sponsored by Danish International Development Assistance (Danida). The Egyptian Environmental Affairs Agency (EEAA) is the executing agency for EIMP. The prime contractor for the EIMP is the consulting company COWI Consulting Engineers and Planners AS (COWI), based in Copenhagen, Denmark. VKI and the Norwegian Institute for Air Research (NILU) are participating as subcontractors for COWI.

One of the five components of the EIMP is the Air Pollution Monitoring component. This component seeks to develop EEAA capacity to obtain and manage information about the air pollution. It will involve the development of an air pollution monitoring programme included data collection, data transfer, quality assurance procedures and an air pollution database at EEAA.

The EIMP will develop the capacity of EEAA to obtain and utilise reliable data on air pollution by contracting a selected institution to carry out the monitoring activities and to report the results to EEAA. EIMP will develop the capacity of this selected monitoring institution to carry out the monitoring work, including provision of necessary equipment, training and initial supervision, and development of quality control procedures. The monitoring institution will also participate in a laboratory quality assurance programme supervised by an independent reference laboratory, which is also being established under the EIMP.

2. Objectives

The goals of the EIMP Air Pollution Monitoring for Egypt are to conduct monitoring, sampling and laboratory analyses of air pollutants at a number of stations (Residential, Industrial, Urban, Street Canyon and Road Side). Standardised automatic monitors as well as sampling and analysis procedures will be established.

The main part of the information on air pollutants such as SO₂, NO_x, O₃, CO, PM₁₀ and NMHC will be collected through automatic monitoring stations. Additional information on TSP, SO₂, NO₂ and soot/Black Smoke (BS) will be collected using high volume and/or sequential samplers. Statistical programmes for quality controls and presentations may be introduced as part of the EEAA data base system.

By the end of the programme EEAA will be able to:

- have a network for air quality,
- present data on a routine basis,
- establish a basis for strategies to reduce air pollution and
- estimate air pollution impact from present and future developments.

3. Overall Activities

Data collection, sampling time and frequencies

Data collection, sampling and analysis will follow Standard Operation Procedures (SOPs) at points specified in Appendix A.1 and with frequencies specified below.

The instruments used in the air quality monitoring can be divided into two categories according to the method of data collection (see table below)

Air quality data collection methods.

Method	Instruments
Manual and semi automatic sample collection .	Hi vol TSP, PM ₁₀ , sequential samplers for SO ₂ , NO ₂ , BS and lead and dust fall collector.
Air pollution monitor, automatic (electronic) data collection .	Monitors measuring SO ₂ , NO, NO ₂ , NO _x , O ₃ , CO, NMHC, PM ₁₀ and meteorological parameters .

Manual sample collection will be done by a technician who visits the site at regular intervals to collect the samples. The samples are brought the laboratory for analysis.

Observations of unusual conditions which may require immediate response must be reported to the Client
When using automatic monitors for data collection the analysis is performed at the site by the instrument and the result is stored electronically in a data logger. The typical data averaging period is 1 hour. The results are transferred to the computer centre via modem automatically once a day or manually once a week on diskette if a telephone line is not available.

The averaging time and the sample collection period/site visit frequency depends on the instrument used and the parameters measured, see table below.

Averaging times, site visit and maintenance frequencies for different instruments.

Instrument	Averaging time	Sample frequency	Site visit frequency	Maintenance frequency
Hi vol TSP	24h	Ev.6th day	Weekly	Ev.3 months
PM ₁₀ sampler	24h	Weekly	Weekly	Ev.3 months
Sequential sampler SO ₂	24h	Weekly	Weekly	Yearly
Sequential sampler NO ₂	24h	Weekly	Weekly	Yearly
Sequential sampler BS	24h	Weekly	Weekly	Yearly
Dust fall collector	1 month	Monthly	Monthly	Yearly
Monitor SO ₂	1h	Daily/weekly	Weekly	Ev.3 months
Monitor NO, NO ₂ , NO _x	1h	Daily/weekly	Weekly	Ev.3 months
Monitor O ₃	1h	Daily/weekly	Weekly	Ev.3 months
Monitor CO	1h	Daily/weekly	Weekly	Ev.3 months
Monitor NMHC	1h	Daily/weekly	Weekly	Ev.3 months
Monitor PM ₁₀	1h	Daily/weekly	Min.weekly	Ev.3 months
Meteorology sensors	1h	Daily/weekly	Yearly	Yearly

The total number of data to be collected and stored each year has been estimated to about 22 millions. A maximum needed data storage capacity is assumed to be about 100 Mbyte.

Data retrieval at the Consultant

Data from automatic monitors are transferred to the computer center via modem and telephone automatically once a day. If such communication is not available the data will be collected manually once a week on diskette. After data quality control and scaling to scientific units the results are entered automatically into the monitoring database.

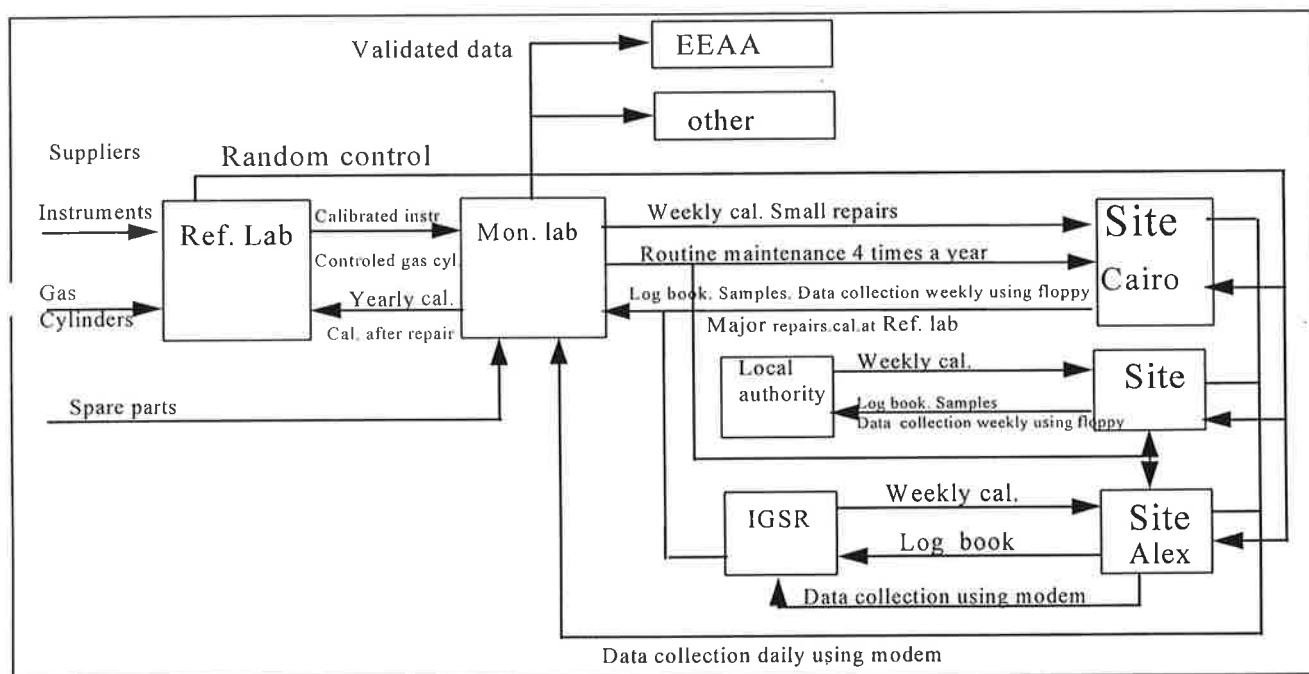
Samples from manual and semi automatic samplers will be brought to the Consultant (Monitoring Laboratory) for chemical analysis and scaling to scientific units. After data quality control the results are entered manually into the monitoring database. The data base structure will have to be decided following specifications by the instrument supplier and will depend upon the data retrieval and data storage possibilities in the total monitoring system.

Data reduction will be performed, aggregating primary data into secondary data. Formats for storing primary data, reduction and storage of aggregated data will be documented & agreed with the Client. File copies of all primary and secondary data will be maintained. Primary and secondary data will be transferred to the Client.

Data quality check and control procedures

Data quality check and control shall include both instrument maintenance and data quality assurance and validation. Each instrument in the ambient air monitoring network is supervised by personnel from the Consultant although some of the instruments can be operated by local site technicians. Because the personnel at the Consultant must specialise in a limited number of instruments, the Consultant can have one or more persons involved at one specific site.

A typical quality assurance flow sheet is shown below.



The air quality QA/QC and data management procedures will be implemented for all measurement sites in Cairo, Alexandria and in other Governorates of Egypt. Totally at about 40 sites included about 25 monitoring stations.

Instrument maintenance

Instrument maintenance and calibrations by the Consultant will depend upon the final specifications given by the instrument deliverers, and will typically include :

- daily automatic two point calibrations performed at the sites and transferred to the computer centre,
- controls and service (air intake filter changes?) of ambient air quality monitors once a week at the site,
- periodical maintenance and control of the instruments at the site including zero span calibration,
- documentation of all maintenance in site log journals.

The Consultant is responsible for periodical maintenance of the instrumentation at all measurement sites. This includes routine maintenance and check of the instruments at the site. The Consultant is also responsible for repairing instruments at the site, in the laboratory or in exceptional cases bringing an instrument to the Supplier/Manufacturer for major repairs. In the cases when repairs exceeds 10% of the cost of the instrument, EEAA has to be notified (see Appendix C par.2.5.) After repair the Consultant will bring the instrument to the Reference Laboratory for recalibration before installed in the field again.

In some cases it may be necessary to use local trained personnel for weekly maintenance at the sites. This includes filter changes and collection of monitor data on diskette if a telephone line is not available. The local personnel shall as soon as possible report to the Consultant if any instrumental problems occur.

The instrument maintenance will in the future be supported by the Reference Laboratory which will (see also Appendix B.2) :

- calibrate new instruments and control new gas cylinders,
- undertake controls and calibration check at the sites during the annual audit visit,
- undertake annual calibrations of the monitors.

Data evaluation at Consultant

A basic evaluation of the data will be performed by the Consultant during data retrieval and primary data checks. This part of the data evaluation includes:

- inspection of retrieved data to see if the instrument is in good order,
- inspection of results from two point calibrations (monitors),
- inspection of all site log journals from site visits,
- removal of invalid data,
- documentation of evaluations.

Data evaluation will be performed by the Consultant according to documented procedures. Data evaluation includes removal of data which is obviously invalid such as data from weekly calibrations, instrument malfunctions, power failures etc. It also includes inspection of data to see if they are within reasonable ranges or if they indicate instrument failure. The results from the weekly two point calibrations as well as the report sheets from all site visits by both site technicians and people from the Monitoring lab are important inputs to the data evaluation.

Quality Control

Perform quality control as described in procedures prepared by the Consultant according to recognised standards and guidelines, documented in a quality assurance manual as presented by the Reference Laboratory.

4 Activities for 1997

The specific activities for 1997 as decided upon by the Client after consultation with the Air Pollution Monitoring working group, will depend upon instrument deliveries and site preparations and establishments. A budget estimate for 1997 activities is presented in Appendix C.3.

5. Record keeping and reporting

The Consultant shall:

- keep updated lists of equipment received from EIMP as well as maintenance records (see Appendix B)
- keep updated sampling station records
- prepare quarterly progress reports stating progress in relation to agreed monitoring programme and submit report to the Client latest four weeks after the end of each quarter
- prepare annual proposals for amendment of monitoring programme and submit to the Client latest two months before the end of each calendar year
- prepare annual data assessment report to the Client and submit latest one month after the end of each calendar year.
- the data and information collected can be used by the Consultants for studies and research after prior agreement with the Client.

6. Management and Administration

The Consultant shall

- prepare and maintain quality system according to the requirements in ISO Guide 25. The quality system shall fulfil all requirements no later than 31 December 1998
- prepare quarterly invoices to the Client according to the performance in relation to unit operations
- liaise with the Client and participate in appropriate training courses as arranged through the Client and participate in working groups as required
- facilitate and assist the work of “co-operative review” (audit) personnel from the Air Reference Laboratory.
- assign the Official Representative of the Consultant and key staff for the positions according to the organisational chart and job descriptions attached as Appendix A.3. The identified key staff members with Curriculum Vitae are given in Appendix A.3. In case of non performance of any involved staff of the Consultant, the Consultant is obliged to replace such staff upon the request of the Client.

7. Facilities and equipment to be provided by the Consultant

All laboratories, other facilities and equipment necessary to carry out the air pollution monitoring work to the same quality standards as required in the monitoring network shall be provided by the Consultant unless it is listed as the Client's contribution in Appendix B. The Consultant will maintain all facilities and equipment necessary for the assignment.

In areas where the Consultant does not have the necessary competence or in cases where it will be practical for the performance of the necessary tasks defined, the Consultant shall delegate the activities to a subcontractor which has been judged competent in the area. The quality of the subcontracted work shall be ensured by the Consultant, for instance through the use of an accredited subcontractor or due surveillance of the subcontractor by the Consultant.

8. Additional work

No work except what is specified in this Agreement including appendices shall be carried out unless a written addendum to the Agreement is signed by both parties.

Appendix A.1 Monitoring sites and parameters

EIMP Air Quality Monitoring Programme Location of instruments

Site name	Area type	Monitors							Samplers							
		SO2	NOx	PM	HC	O3	CO	Met	PM	TSP	VO	SO2	NO2	DF	PS	TF
Greater Cairo area																
1 El Gemhoroya street	Street canyon	1	1	1	1		1									
2 Ain Shams University	Urban / Res.	1	1					1								
3 Embaba police station	Road side		1		1		1		1							
4 Cairo city centre	Urban centre	1	1	1			1	1								
5 Nasr City	Residential								1			1	1			
6 Shoubra el Kheima.	Industrial	1		1						1			1	1		
7 Maadi(police station)	Residential	1	1						1							
8 Tabbin	Industrial	1	1	1				1		1				1		
9 Tabbin south	Industrial								1			1		1		
10 Giza, Cairo University.	Residential	1	1		1			1								
11 Giza pyramid	Regional											1	1	1		
12 Abu Zabel	industrial													1	1	
Alexandria																
13 Abu Keir College	Industrial	1	1								1	1			1	
14 El-Max Petrogas	Industrial									1		1	1	1	1	
15 IGSR, Alex University	Urban/road side	1	1	1	1		1	1								
16 El-Asafra-El Azhar Univers.	Residential	1		1												
17 Gheat El-Inab school	Residential									1			1	1		
18 NIOF	Outside city						1									
Delta																
19 10 Ramadan	resid./ind									1		1		1		
20 6 October	industrial/ res.									1		1	1			
21 Damanhur	industrial/res	1												1		1
22 Kafr el Zayet	industrial/res	1	1											1		
23 ElMahalla El Kubra	industrial/res.	1		1										1		
24 El Mansura	industrial/res.	1	1								1			1		
25 Damyat	resid	1						1		1				1		
26 Tanta	urban											1				1
Canal area																
27 Suez	industrial/res.	1	1												1	1
28 Port Said	Residential															1
29 Ismailia	residential	1														1
Upper Egypt																
30 El Fayum	resid./ind											1			1	1
31 El Minya	Res./ Industrial									1				1		
32 Nag Hammadi	industrial/res											1				
33 Assyut	industrial/ res.	1	1					1		1				1		
34 Assyut 2	residential/urban														1	1
35 Kom Ombo	industrial													1		
36 Idfu	Industrial/res.													1		
37 Aswan	Industrial/ res.													1		
38 Luxor	residential	1				1	1							1	1	
39 Sharm ElSheik	background						1									1
Monitoring Laboratory		1	1	1	1	1	1	1	1	1	1	1	1			
Reference Laboratory		1	1	1	1	1	1				1	1	1			
Instruments total		21	15	9	6	6	6	8	11	5	5	11	7	20	6	8
Instruments from other inst		1	1		1	1	1	1								
Total required		20	14	9	5	5	5	7	11	5	5	11	7	20	6	8
Totally to be purchased?		18	14	9	5	7	5	7	10	5	5	12	7	9	0	0
Extra instruments needed		2	0	0	0	-2	0	0	1	0	0	0	0	11	6	8

Appendix A.2 Deliverables

The deliverables from the activities of 1997 are :

A:

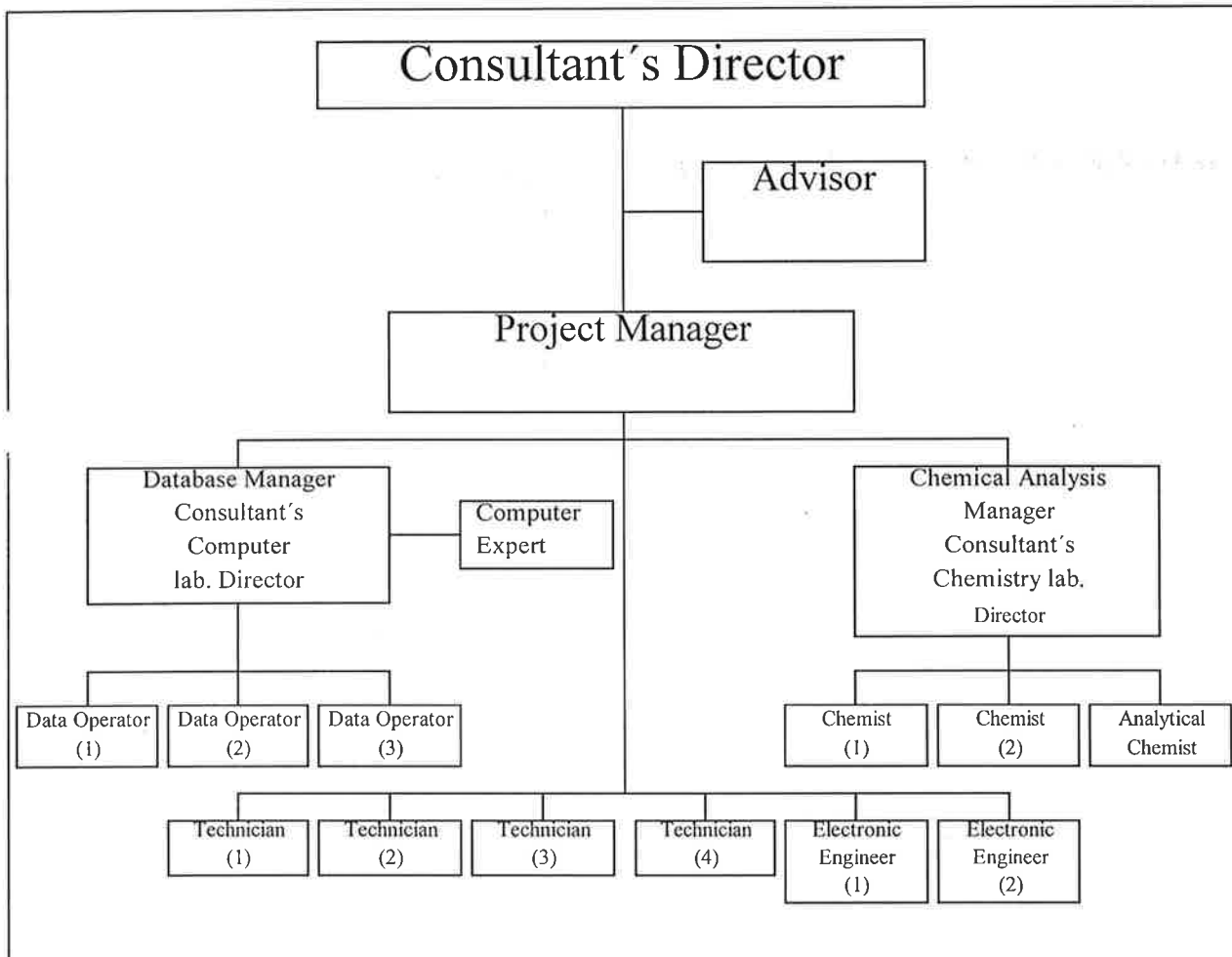
- Data reports for the monitoring stations operated in Greater Cairo and Alexandria,
- Daily internal reports for data Quality controls,
- Quarterly reports, including primary data descriptions and data summeries,
- Annual report including secondary aggregated data.
-

B:

- Plan of activities for the following year

Appendix A.3 Key staff and Organisation chart

The Client will supervise the work of the Consultant, and provide the basic technical input and training. The Consultant shall establish an organisation as outlined below:



KEY PERSONNEL

- Consultant's Director:
Prof. Dr. Mohamed EL-SHARKAWY
Dean: Faculty of Science and Director of CEHM
- Manager of the Air Quality Monitoring Stations
(Name will be provided by EEAA and EIMP)
- Manager of the Database Laboratory:
Assistant Professor Hesham El Araby
- Director of the Chemical Laboratory:
(Name will be provided by CEHM)

N.B: The Consultant's Director and/or Laboratory Directors together with the Manager of the Air Quality Monitoring stations will be responsible collectively for contacting the Client.

1 Consultant's Director Responsibilities:

- Supervise the overall operation,
- consult on weekly basis with laboratory directors and air monitor manager on the progress of the operation,
- Appoint the required personnel to conduct activities described in the contract,
- Represent the Consultant at meetings in EEAA/EIMP and/or delegate qualified personnel to attend the meetings on his behalf,
- Approve all invoices prior to submission to the Client,
- Facilitate cooperation with Cairo University bureaucracy,
- Negotiate and sign on contracts as the designated representative for the Consultant,
- Approve all purchase orders made by the Consultant in relation to the project.

2- Air Quality Monitoring Programme Manager:

- Main responsible for managing and reporting the Air Quality measurement programme
- Manage the Air Pollution Stations at the Consultant and be the main contact person to the Client,
- serve in EIMP Air Pollution Monitoring working group with a representative from CEHM,
- ensure that monitoring work contracted is performed timely and with adequate quality,
- report directly to the Consultant's Director,
- assign duties to his staff of Air quality monitoring stations. (see organization chart),
- forward his requirements to the Center labs directors to be carried out by their staff,
- update and maintain the quality of the sampling programme and be responsible for adequate operation and good quality of the collected data.

3- Database Manager (Consultant's Computer Lab. Director) responsibilities:

- Assure that all assigned duties from the Client in relation to the computer laboratory will be carried out in time and without interference with CEHM activities,
- supervise data extraction, transfer, reduction, aggregating primary data into secondary data, format verification, archiving documentation, and file copy,
- work closely with the chemistry Lab Director and the Air Monitor Director on developing and implementing quality assurance procedures,
- work with the chemistry Lab Director and the Air Monitor Director on the preparation of reports (e.g., quarterly and annually).
- keep updated records for the stations measurements, maintenanc records, equipment list in a well organized database,
- provide the Client with the data on quarterly basis on CD's and diskette.

4 Chemical Analysis Manager responsibilities :

- Assure that all assigned duties from the Client in relation to the chemistry laboratory will be carried out in time with no contradiction with the CEHM normal work.
- Responsible for the sampling programme (hivol, sequential, deposition..)
- Plan sampling routines, assign duties to analytical chemists.
- Evaluate results of analyses. Correct data.

- › Assure with the other two managers the quality assurance of chemical analysis data.

5 Advisor responsibilities:

- Evaluate consultant's plans and progress of work,
- Report evaluation to the director,
- Provide the Consultant with additional training in Egypt and USA if needed,
- Build collaborative efforts between CEHM, Argonne National Laboratory, and EEAA

N.B.:note no expenses are required for the advisor

6 Computer expert responsibilities

- Assign jobs for the data experts,
- data processing and evaluation,
- produce output graphics and maps,
- introduce calibration factors and correct data through the quality assurance group feedback,
- report errors and problems.

7- Data experts responsibilities

- Daily routines for transferring automatic data from the air monitoring stations via modem.
- data transfer of both automatic and manual data into the database.
- entering sampling data from chemical analyses into database.
- prepare printouts.
- prepare simple graphics and report to database manager daily.

8- Electronic engineer responsibilities

- › Responsible for the monitors at the sites and participate in daily data retrieval.
- assigned to a defined set of monitors and monitoring sites,
- responsible for following up daily routines and weekly calibrations at the monitoring sites,
- report all errors and mistakes following designed log protocols at the sites,
- check instruments in field and take them to the laboratory for maintenance and for minor repairs.

9- Physical engineer responsibilities

- Calibrations and instrument controls at the monitoring sites,
- assigned to a defined set of monitors and monitoring sites,
- work in parallel and close co-operation with the electronic engineer,
- report all errors and mistakes following designed log protocols at the sites,
- check instruments in field and take them to the laboratory for maintenance and minor repairs,
- take care of monitors at the laboratory,
- in-house repairs including spare parts, etc.,

10- Technicians/engineers responsibilities

- Daily sample retrieval at different sampling sites,
- following up daily routines and weekly calibrations at selected (assigned) monitoring sites,
- report all errors and mistakes, check instruments, maintain and undertake minor repairs in field,
- bring instruments in for repair in lab., if necessary.

11- Analytical chemist responsibilities

- Prepare samples and undertake analyses,
- calibrate instruments, prepare various filters,
- evaluate results of analyses and correct data,
- daily routines in chemical laboratory, reporting errors and mistakes,
- assure that good quality data from the chemical analyses are transferred to the database.

12- Chemist responsibilities

- Prepare samples and undertake analyses in the laboratory,
- prepare various filters (solutions),
- participate in calibrations,
- evaluate results of analyses and correct data,
- produce good quality data from chemical analyses.

Appendix B.

Personnel, equipment, facilities and services of others to be provided by the Client

1 Personnel

No personnel will be provided by the Client for the purpose of the services.

2 Equipment

2.1 The Client will loan to the Consultant the equipment according to the summary list given in Appendix B.1. The equipment is the property of the EIMP programme, which is being executed by the Client with financial assistance from Danida.

2.2 When the equipment is taken to the premises of the Consultant, the Consultant will sign a detailed list of the equipment including name, serial number, value, manufacturer and any other information identifying the item clearly. This list is proof of receipt.

2.3 When the equipment has been unpacked, installed and tested, the Consultant will sign the detailed list once more as proof of having received the equipment items on loan in good working order.

2.4 The equipment will be maintained by the Consultant at his own expense, according to good practice and according to instructions given by the supplier and manufacturer.

Maintenance requiring specialised knowledge shall be made by authorised agents of the supplier or manufacturer.

2.5 Replacement of single parts with a value of over 10% (incl. labour) of the value of the instrument as given in the list (re para 2.2) will be considered outside normal maintenance. It will be arranged for by the Consultant and paid by EIMP unless breakdown is due to carelessness, misuse or lack of maintenance.

2.6 During the warranty period, the supplier's or manufacturer's agent shall be informed about any equipment deficiency or breakage for possible remedy under the warranty.

2.7 A log book shall be kept for each instrument. The log book shall record the use of the instrument and the maintenance done.

2.8 In case of termination of this Agreement, the Consultant shall immediately return the equipment being on loan from EIMP (re para 2.2) to a store designated by the Client.

Any expenses in connection with such return shall be covered by the Consultant.

3 Facilities

No facilities will be provided by the Client

4 Services of others

The Client will provide technical advice through EIMP as well as initial training and instruction to the Consultant. The training programmes will be developed in co-operation between EIMP and the Consultant.

The Client will also provide the services of a Reference Laboratory providing training in QA/QC and providing the Client and the Consultant with data on the quality of sampling, analysis, tests and measurements as stipulated in Appendix B.2, being a copy of the scope of services for Reference Laboratory - Air.

Appendix B.1 list of equipment provided by the Client

Below is the list of equipment to be loaned by the Client to the Consultant

This equipment will be provided in stages according to the time schedule of the work to be done under this contract and can be subject to minor changes

The estimated total cost of the equipment in this Appendix is 4,077,687

Egyptian Pounds.

The contract budget line for maintenance shall be based on this figure but year for year adjusted to correspond to the equipment received.

Description	Quantity (minor changes may be implemented)
SO ₂ monitor	18
NO _x monitor	14
PM ₁₀ monitor	9
O ₃ monitor	6
CO monitor	4
NMHC monitor	5
Zero/ Span TEI 145	13
Perm. span TEI 43C-400	7
Zero/ Span TEI 102S-2	4
Zero TEI 1150	5
SO ₂ span gas, monthly control	1
NO span gas, monthly control	1
CO span gas, monthly control	1
HC span gas, monthly control	1
CO span gas, shelter	4
HC span gas, shelter	4
N ₂ carrier NMHC	5
SO ₂ permeation tubes	17
NO ₂ permeation tubes	13
Air intake	14
Meteorology sensors	7
Meteorology radio link	1
Data acquisition	24
Seq. air sampler	19
PM ₁₀ HiVol	10
TSP HiVol	5
VOC sampler	5
Rack/ table for monitors	24
Dust fall	19
Portable Meteorology sensors	1
SO ₂ calibration gas,	1
NO calibration gas,	1
CO calibration gas,	1
HC calibration gas,	1

Sample filter, teflon	9
Repair tools	7
Laboratory items	1
Car, Mitsubishi Pajero GL	1
Motor scooter, Yamaha YB100	6
Computer comm. and data display	1
Computer center computer	2
Computer center printers	2

Appendix B.2 Scope of services for the Reference Laboratory

Installation and calibration of monitors at Reference Laboratory

As soon as the instruments are available in Egypt the installation of air pollution monitors will start. The installation will be undertaken by the EIMP air pollution monitoring expert together with experts from the instrument suppliers.

Calibration of monitors in the EIMP air quality monitoring programme will be undertaken at the Reference Laboratory. However, some calibration may also be undertaken at the Monitoring Laboratory in the beginning. This will also be performed as a training activity.

Calibration will in the future be the routine operation at the Reference Laboratory, as all monitors that will be installed will have to undergo a calibration and check at the Reference Laboratory, before installation in field. The Monitoring Laboratory will have to bring monitors to the Reference Laboratory for calibrations as soon as they have been taken in for major repairs.

Measurement activity assessments (audits)

The Reference Laboratory will perform assessment of the measurements at least once every year for each site. In this connection the Monitoring Laboratory personnel will have to prepare whatever information is requested from the Reference Laboratory. Quality Control and Quality Assurance procedures have to be described and made available, and SOPs have to be presented. All station log books, calibration procedures and data corrections have to be documented.

Interlaboratory studies and proficiency tests

The Monitoring Laboratory will have to participate in all proficiency tests and intercalibration procedures that will be required by the reference Laboratory. Quality Assurance procedures and verifications described by the Reference Laboratory will have to be followed.

Appendix C. Payments

1 Performance based payments

1.1 The payments for the Services of the Consultant will be based on documented, delivered Services according to Appendix C.1 for 1997. Appendix C.2 gives unit rates for all services under the programme. The unit rates and the lump sums cover the full remuneration of the Consultant.

1.2 Invoices to the Client can be made quarterly, (quarterly meaning 1 April, 1 July, 1 October and 1 January),

1.3 according to delivered services documented in the quarterly reports. The invoice shall be based on the unit rates and the number of units delivered. Lump sums covering the maintenance of EIMP equipment, administration, programme management and other costs can be invoiced in equal instalments each quarter.

1.3 An amount of 50% of the last quarterly invoice each year will be withheld by the Client until the annual report is approved by the Client.

1.4 Payments from the Client will be made no later than 30 days after receipt of a valid invoice from the Consultant.

1.5 An advance of 15% of the total contract sum can be paid after signing of the contract.. The advance will be recovered equally through the quarterly payments.

2 Adjustment of unit rates

The unit rates accepted by the Client for 1997 can be adjusted annually according to a percentage mutually agreed by the parties before contract signature. Adjustment will take place at the end of each calendar year according to the percentage agreed.

3 Payment for additional work

Work in addition to that specified in the Agreement can only be carried out after an addendum to the Agreement has been completed and signed by the parties. The payment schedule for the additional work shall be set out in the addendum.

Appendix C1: Budget estimate

I- Monthly Salaries:

	Full-time/Part time	L.E./month
Director:	P	750
Program Manager	F	1500
Database Manager	P	625
Chemical Analysis Manager	P	625
Electronic Engineer	F	1000
Physical Engineer	F	1000
Analytical Chemist 1	P	500
Analytical Chemist 2	P	500
Computer Expert	P	500
Data Expert 1	P	380
Data Expert 2	P	380
Data Expert 3	P	380
Chemist	P	380
Technician 1	F	500
Technician 2	F	500
Technician 3	F	500
Technician 4	F	500
Accounting	P	250
Driver	F	380
Total salaries		11 150 L.E./ Month = 133 800 L.E. / Year

II- Chemical Analyses

	L.E./ Sample	Number of	L.E./Year Samples/Year
Dust fall	10/sample x 200samples		=2 000 LE
SO ₂	10/sample x 2750samples		=27 500 LE
NO ₂	10/sample x 2750 samples		=27 500 LE
TSP + PM ₁₀ + Pb	50/sample x 100 samples		=5 000 LE
Total: Chemical Analysis Budget			62 000 L.E. / Year

The Client will provide the Consultant with chemicals required to carry out this analysis.

III Reports

		L.E.
• Quarterly report	6000 EL x 4 reports	24 000 LE
• Annual data assessment report		6 000 LE
Total Reports Budget		30 000 L.E. / Year



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