NILU : OR 62/96
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DANIDA

# Air Quality Monitoring Programme

## Mission 3 Report

EIMP Environmental Information and Monitoring Programme

NILU Norwegian Institute for Air Research

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# DANIDA; Air Quality Monitoring Programme

## Mission 3 Report

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# 1 Introduction

A third visit to Egypt was undertaken in October 1996 as part of the development of an Environmental Information and Monitoring Programme (EIMP) for the Arab Republic of Egypt. NILU is responsible for the establishment of an air pollution monitoring system. During the visit in October 1996 B Sivertsen and Leif Marsteen participated.

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

The visit to Egypt in May-June was part of the Phase 1 and an introduction to phase 2 of the project. The main objectives of this visit was to undertake remaining work on part A and the specified tasks of part B, C and D of the work programme activities:

A.1.1. Prepare background for air quality monitoring working group
A.1.2. Job descriptions for air quality monitoring lab. personnel
B.2.1. Select representative monitoring sites for AQ measurements with special emphasis on Alexandria and pending sites in Cairo
B.2.5. Select sites for meteorological measurements
B.2.6. Specify meteorological data
B.2.7. Specify use of existing equipment
C.1.1. Evaluate existing equipment
C.1.2. Finalise list of equipment and procurement document
D.1.1. Specify data collection and data transfer
D.1.2. Specify data retrieval and local data base at monitoring lab.
D.1.3. Specify data quality check and controls
D.1.5. Data base manually analysed data

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

# 2 Meetings 2 October 1996

## 2.1 Introductory meeting

Jan Hassing briefly introduced the status of the project, and quickly turned to some immediate business including three meetings appointed for the morning and afternoon.

A note should be prepared concerning the large amount of hours spent at NILU during the procurement phase of the project ( see Appendix B).

One possible counterpart for the air quality monitoring system has been identified. This person will be employed by EEAA, but may have to be stationed at the Embaba lab as responsible for the monitoring system. His main task will be to see that all the data delivered to EEAA are quality assured and that the staff at the Monitoring laboratory in Embaba is undertaking their duties in a proper way. The name of this person is Mohammed Nassar.

After the meeting a note has also been prepared concerning the necessity of having an open data base for all air quality data in Egypt. This represent the main background for a good co-operation between different institutions. (see Appendix B).

It is also clear that Professor Nasrallah will be the responsible in charge of the reference laboratory. In this connection Professor Nasrallah had prepared a note with some comments and questions (see Appendix C). The questions were answered and commented on the phone, and later during our visit we met with professor Nasrallah.

## 2.2 Etico Scientific co. and C.K.Environment ApS

Claus Andersen from C.K. Environment ApS and Ms. Nivert Seif from Etico presented in a meeting at EIMP with Bjarne Sivertsen, Jan Hassing and Leif Marsteen their companies. Their background for the visit were connected to the ambient air monitoring part of the EIMP project.

C.K. is a Danish company working in the field of both emission and ambient air pollution monitoring. They have installed an ambient air monitoring network in Copenhagen using monitors from Thermo Environmental. Today

the Finnish based company Kontram seems to take over as the main Thermo Env. agent in Denmark. However, C.K. Environment also can offer these instruments and many more on the Danish marked.

Andersen pointed out that negative $NO_2$ values may be a problem in single channel monitors when measuring close to the roadside. According to him Echo Physics' $NO_x$ monitor manages this problem while Thermo Environmental's and Monitor Lab's do not. NILU using Monitor Lab monitors has never experienced similar problems.

The Siegrist continuous dust monitor is one specific instrument that Mr Andersen provided. He claimed that the instrument is half the price of the TEOM instrument, and as reliable and good. (price about 160,000.- DKK).

Etico is an Egyptian company working in the field of traditional laboratory equipment and monitors. They have delivered some ambient air monitors from Monitor Lab as well as a few meteorological sensors. Etico has a small work-shop for repairs and maintenance and a service staff including three laboratory engineers and one full time service engineer. They normally offer one year guarantee.

C.K. wants Etico to be their Egyptian agent if C.K. gets (part) of the deliveries to the EIMP project. They also were willing to offer installing and training in the use of the equipment delivered.

## 2.3 Mohammed Nassar

Mohammed Nassar has been considered for being the EEAA responsible and our counterpart for the air quality monitoring network in Egypt.

He has a B.Sc. degree in chemistry and physics from the Cairo University in 1969. (see Appendix D). He was the director of the national network for air pollution monitoring and analyses at EOHC in Embaba and was employed here from 1978 till 1995. He has been running impact assessment studies, operations and calibrations of instruments and he is at present responsible for environ-mental studies on air pollution at the Tabbin Institute for metallurgical studies. He also participated in the US Aid study on particulate pollution in Cairo.

Mr. Nassar seemed to have a realistic picture of the situation in Egypt, and seemed willing to do his best and participate in the establishment of a national air quality monitoring system for Egypt. His position as the leader of a team located in the Embaba laboratories was to his satisfaction. He liked the possibility of being the liaison between the Monitoring Laboratory (Embaba) and EEAA. He also had undertaken several projects together with Professor Nasrallah, and seemed to get very well along with him.

In the final discussions we decided that Mr Nassar will accompany us on the site visit to Alexandria, where we also will meet with the local Health Authorities and Dr ElRaey at the University of Alexandria.

A list of tasks and duties was prepared and discussed with Mohammed Nassar. It seems from the discussions with Dr. El-Zarka that he will be appointed the EEAA counterpart for task manager of the air quality monitoring programme.

## 2.4 Anwar Ahmed on procurement documents

Mr. Anwar Ahmed has been called in to COWI/DANIDA for preparing all the procurement documents. He has been through the set of documents prepared by NILU and was satisfied on most points.

The main question was concerning the advantage in the possibility of having one bidder support a total system including monitors, data retrieval systems, shelters etc. We agreed that for all purposes (completeness, insurance, warranties etc.) we would prefer to have it this way. However, in some cases it will not be possible. Several of the instruments and side equipment has to be itemised.

The offers could be divided into 3 groups:

1. Single offer (presented within 15 days )
2. Two-bidders (or more?) ( within 4 weeks)
3. Complete package ,several bidders (within 4-6-weeks) (itemised also)

The technical evaluation, which has to be undertaken by NILU, will probably be prepared in mid November. There will have to be a feed back between the technical evaluation and the commercial evaluation (undertaken by COWI).

It will be advisable to establish a kind of score system for the specifications, based upon requirements, quality, content, other offers (training etc.). NILU should, if possible, specify a standard AQ station and relate the incoming offers to this specification.

## 2.5 Meeting with professor Nasrallah

The selected monitoring sites for the air quality monitoring programme were briefly presented and discussed. Professor Nasrallah will not be able to meet in the first working group meeting scheduled to be held on 21 November 1996. He therefore agreed in commenting the written materiel available in the Mission 2 report. He will also get access to the Mission 3 report. Comments to the siting in Cairo is presented in Appenix C.

The Reference laboratories activities related to the air quality monitoring programme was discussed. The data flow sheet and the control and quality assurance programme indicated in item D of the work programme was agreed upon.

Professor Nasrallah wanted to undertake random inspections and controls to selected monitoring sites, to check that the instruments and routines are being followed. He also wanted to have direct access to the local data base at the monitoring laboratory, to enable final controls of physical data ( in concentration units), before the data are officially transferred to EEAA for statistical processing and presentation.

He is not sure that log books are sufficient to follow up the local site data quality controls. He also indicated the need for running monitors in parallel. New well calibrated instruments could be brought from the Reference Lab to the sites and run in parallel for a short period of time. We stressed that this kind of control also could be performed by random calibration using well calibrated gas bottles taken directly from the calibration lab to the sites.

The results from the screening study undertaken in June 1996 in Cairo using passive impregnated filters to measure $SO_2$ and $NO_2$ was presented and discussed. The $SO_2$ concentration distribution in Cairo for the weekly averages measured from 7 to 14 June 1996, show an area of $SO_2$ concentrations covering central Cairo exceeding 100 $\mu g/m^3$ . The results are in agreement with earlier statements from professor Nasrallah.

For the obligations at the NRC as a reference lab. for the air quality monitoring system professor Nasrallah wants to hire new staff: One electronic engineer and one chemical engineer.

The requirements for the NRC concerning air quality should be stated in a letter to NRC. It should specify space requirements and staff requirements. If lead analyses are to be performed at the new AA spectrometer at EEAA the Reference lab should also have the quality assurance for this obtaining one half filter at least once a month.

# 3 Meeting with Dr. El-Zarka

The Agenda for a meeting with Dr El-Zarka on 14 October 1996 is presented in Appendix G. Jan Hassing and B Sivertsen from EIMP, and Dr El-Zarka, Dr Abdil Latif and Mr Mohammed Zaki participated in the meeting.

The status of the siting studies including the measurements with passive $SO_2$ samplers performed in June was presented and discussed.

The organizational charts and job descriptions for the EEAA air quality monitoring programme counterpart and the monitoring lab personnel was discussed. Dr. Mohammed Nassar was mentioned as a possible counterpart person, hired by EEAA with a responsibility for supervising, managing and planning plus being responsible for the QC/QA at the monitoring institution. He will act as the liaison between the monitoring lab and EEAA, and will have to spend a major part of his work time at the Motoring lab.

Dr. El-Zarka wanted to meet with Dr Mohammed Nassar. This meeting took place the following day. Dr. Nassar was offered the position as our counterpart, but the salary offered by EEAA lead to a considerable decrease in salary compared to his present salary at (TIMS) Tebbin. This problem should be solved, and Jan Hassing is presenting the problem of salaries for our counterparts to the steering committee meeting.

It also became clear that a contract will be prepared with Embaba Lab as the Monitoring laboratory. This contract will have to contain building/construction work, rentals of space and lines ( telephone and power) and salary for the staff. Several new staff members are identified and have to be found. Dr. Nassar is willing to start working with this problem.

The proposed Terms of Reference for the Air Quality Monitoring working group was discussed, and Dr. El-Zarka agreed on the proposal with two changes that have been already adjusted in the note.

# 4 3 October 1996, Visit to EMOHC lab. in Embaba

Bjarne Sivertsen and Leif Marsteen met with Mohammed J Refaye and supporting staff at EMOHC lab. in Embaba to see and discuss room facilities for the measurement station and the monitor laboratory including computer centre and maintenance and repair lab. Initially Marsteen had planned for three rooms at the EMOHC lab. in addition to the measurement station; a computer room, a maintenance and repair room and a storage room for instruments and gas cylinders.

Possible facilities where found but some work including clean up must be undertaken before they are suitable as air quality laboratories. This work must be terminated at the end of January 1997.

## 4.1 The EMOHC measurement station

At the top of the stairs next to the exit to the flat roof there was an open space of approximately 9 $m^2$. There were windows on the eastern and western side of the room. The southern wall and the roof were made of thick concrete. The area is suitable for housing the EMOHC residential station.

A wall must be built on the northern side to close the room. Electrical power must be supplied to the room. Cables for transmitting data between station and computer centre using RS422/485 signalling must be installed. An air condition must be installed. The windows must be made impossible to open. Necessary holes must be drilled through walls and the roof for air intakes based on specifications from the AQ expert. The meteorological mast may be placed on the roof of the room. A large tree is located 5-6m east of the roof.

Alternatively a container could be lifted in place by a crane on the eastern part (near the road and the Nile) of the roof. There is easy access for a mobile crane on the ground and enough space on the roof.

A container/shelter can easily be placed near the road along the Nile inside the fence of EMOCH. This will be the EMOCH roadside station. The container must be eleated to the roadside level.

## 4.2 The computer room

The presently used computer room located on the ground floor was approx. 40m$^2$. A similar room was available for the EIMP computer centre on the first floor, in the western end, on the northern side of the southmost corridor, almost on top of the existing computer room. There where windows on the northern wall. We could not enter the room since no key was available. The room seemed suitable for the purpose, and will be cleaned and prepared before the end of January.

Air conditioning and a telephone line (preferably two lines) must be installed.

## 4.3 The maintenance and repair room

A room of approx. 30 m$^2$ on the south side, at the other end of the same corridor as the EIMP computer room was available as maintenance and repair room. There where windows on the southern wall. Since the room was so large it can also be used as storage room for monitors, other equipment and a small number of gas cylinders. This eliminates the separate storage room.

An air condition must be installed. The windows must be made impossible to open. A stainless steel sink should be installed. Alternatively washing of items can be done at the Air Pollution lab. on the same floor.

A similar room on the south side of the corridor close to the computer room was also available. We did not see the room since no one had the key. Because of the short distance between the computer room and this room the latter room was chosen.

When the air monitoring equipment starts arriving in January 1997 it must be put in the maintenance and repair room. The door must be kept locked. Meteorological masts can be stored in the repair room at ground floor in the nearby building.

## 4.4 Office for Leif Marsteen

A room in the Air Pollution lab. was available as office for Leif Marsteen. An air condition, a door lock, chair, desk, shelves and a telephone line must be installed.

From March 1997 L Marsteen will be using this office during the first installations and during the training periods at Embaba.

# 5 Site visits to Alexandria

## 5.1 The Health (Medical Centre ) of Alexandria

We briefly met with the office responsible for the air quality sampling network in Alexandria. Responsible for the network is Mr. Nasri Sikri (B.Sc. in chemistry), who followed us to the 4 stations operated by the Health centre. (See siting reports in Appendix E).

The Health centre site at Samoha was located on the roof of a one storey building. The room/house/office can be used for future monitoring. Some repair on the roof and the installation of an Aircon must be undertaken.

At the health centre they have 6 chemists who all have the task of collecting samples and look after the sampling stations. The data quality at the 4 stations seemed satisfactory, even if some of them could be better maintained and serviced. Quality control and maintenance has to be stressed. Some of the samplers (especially the Anderson type) were very dusty and needed some cleaning.

The typical TSP concentration levels at Samoha was about 300 $\mu g/m^3$ in 1994. In the El Max area (site: Wadil el Khamar) the average TSP concentration was about 800 $\mu g/m^3$. This site is located 600 m south of a cement factory. The typical $SO_2$ concentrations seem to be between 20 and 30 $\mu g/m^3$.

We also met with the head of the chemical analytical laboratories at the Health Centre, Dr. Mahab (Chemist). She showed us all the laboratories, and one well organized air cooled laboratory where new Atomic Absorption Spectrometers and a new gas chromatograph was about to be installed and tested.

## 5.2 Meeting with Dr.A El-Dakhakhny

Dr. Dakhakhny has for many years performed occasional air pollution measurements and studies. From 1978 to 1985 he operated 17 stations spread all over Alexandria. In the 1980's 7 monitoring sites were operated. The results of all these measurements have been reported mostly in Arabic. We saw one summary report in English. However, no extra copies of the reports were available.

Many "spontaneous results" have been produced as part of master or doctor degree work. This is quite typical for data available at the Universities in Egypt. A study of traffic air pollution undertaken in 1995 has been reported to the Academy of Science.

We discussed with Dr. Dakhakhny the planned layout and the philosophy behind the new EIMP air quality monitoring network for Alexandria. He agreed upon the design and the selections that we had taken. He stressed the importance of a site in the El Laban District (Abu el Darda).

Dr. Dakhakhny was not keen in participating directly in the future programme, but appreciated that we consulted him. He will also in the near future be retired from the University.

## 5.3 Meeting with Dr El-Raey at IGSR

We visited Dr El-Raey for the purpose of installing a road side station at the Institute of Graduate Studies and Research (ISGR).

The philosophy and ideas behind the design of the monitoring programme for Alexandria was discussed with Dr. El-Raey. He agreed on all points in the selections that were done. He also was pleased to be part of the working group for the EIMP air pollution monitoring programme.

Dr. Said took us on the visit to the laboratories and to the roof top meteorological station (see site report Appendix E). This location will be well suited for the central meteorological station for Alexandria as part of the EIMP/EEAA programme. An Automatic Weather Station (AWS) will be located with a 10 m mast at the roof. Data will be transmitted via radio communication to the air quality monitoring shelter at the security building at the entrance.

The air quality measuring station ( shelter) will be located at the roof of the security building. Telephone lines will be made available, and Dr El-Raey already started this process while we still were there. Data could thus be transmitted directly to the Monitoring Centre in Embaba, and also be accessible for Dr.El-Raey if required.

## 5.4 Site visits

As for the measurements in Cairo $SO_2$ and black smoke(BS) are being measured with two types of sequential 24 h average low volume samplers based upon particle collection on a filter and absorption of $SO_2$ in a $H_2O_2$ solution. Most of the sites had the old fashioned wooden box delivered by Glass Development Limited in England more than 10 years ago. The instruments seemed in general to be in better shape than some of the instruments we inspected in Cairo.

The intake of air for sampling of $SO_2$ and black smoke varied from 3 to 8 m above the ground. Some of the air intakes were located too close to the wall. Some of the intake positions must be improved if the sites are to be used for future monitoring.

The TSP monitors were all based on old Andersen type high volume samplers delivered by General Metal Works Inc. They were all located on the roof of buildings. Most of these sites were representative for the kilometre scale pollution.

Very few of the intake locations are influenced by very local or micro scale emissions. In some areas like El-Max and Laban area the samplers were representative for local industrial emission sources.

# 6 Future air quality measurement programme for Alexandria

## 6.1 Strategy

Six sites were selected for the air quality measurement programme in Alexandria. The sites will cover different scales of air pollution, as stated in the international requirements for air quality monitoring (UNEP/GEMS programme);

- central urban roads and street canyons (kerbside)
- urban scale regions and residential areas,
- industrial areas.

A good location for a background station in this region has not been identified yet.

Different air pollution indicators will be measured at the different sites dependent of the specific sources and problem at that site.

The first priority air pollutants as presented by UNEP/GEMS, WHO, OECD and others are:

- Sulphur dioxide ($SO_2$),
- Total suspended particulate matter (TSP) , or better $PM_{10}$ (suspended particles with diameter less than 10 micrometer),
- Nitrogen dioxide ( $NO_2$) and/or $NO_x$ (nitrogen oxides),
- Ozone ($O_3$)
- Carbon monoxide (CO).

Not all parameters will be measured at all sites. This will be dependent upon site specifications and typical dominating sources. In some sites also dust fall will be measured on a monthly basis with simple dust fall gages.

Meteorological data on an hourly bases will be needed to explain the air quality data collected. Wind speeds, wind directions and atmospheric turbulence (stability) are the most important parameters. One automatic weather stations (AWS) will be established at a central part of Alexandria. The ISGR institute of the Alexandria University was selected for this purpose.

## 6.2 Air quality measurement sites in Alexandria

A total of 6 sites is being proposed for continuous monitors and samplers . When possible automatic monitoring data will be transferred daily via modems and telephone lines to the monitoring laboratory at Embaba. In other cases the data will be collected on floppy diskettes and brought to the monitoring laboratory weekly for retrieval and quality control.

**Site Name:** **Samoha**

**Type of area**: Residential / small industries

**Objectives**: To measure air pollution continuously in a central residential area of Alexandria.

**Parameters:** $SO_2$, $NO_2$, $PM_{10}$ and TSP (gases measured with monitors, TSP with HiVol).

**Air intake**: About 6 m above the street in a fairly open area.

**Comments**: The site is operated for EMOHC by the local health office. Responsible for local inspections will be Mr Nasri Sikri. Data will be collected weekly on diskettes until a telephone line is available at the site.

**Site Name:** **IGSR, Univ. Alex.**

**Type of area**: Road side/urban

**Objectives**: To measure air pollution and meteorology continuously near one of the roads with the highest traffic density in central urban area of Alexandria.

**Parameters:** $NO_x$, $NO_2$, $SO_2$, $PM_{10}$, CO, NMHC and meteorological parameters (measured with monitors and a AWS).

**Air intake**: Air quality at the roof of security room at the entrance, about 10 m from the street 3 m above the surface. Meteorological data will be collected along a 10m tower on the roof of a 6 storey building.

**Comments**: The site is operated locally by the IGSR supported by the staff at the health office (Nasri Sikri) Data will be transferred daily via telephone to the Monitoring Centre at Embaba Cairo. Major services and repair will be undertaken from Cairo.

**Site Name:** **El Saaf ( Emergency station)**

**Type of area**: Urban, open area representative of the. kilometre scale

**Objectives**: To measure air pollution continuously in an open central urban area of Alexandria.

**Parameters:** $SO_2$,$NO_2$, $PM_{10}$ and TSP (ozone?) (gases measured with monitors).

**Air intake**: About 10 m above the ground from the roof of a small building. Intake towards the back yard (away from street) in an open area.

**Comments**: The site is operated for EMOHC by the local health office. Responsible for local inspections will be Mr Nasri Sikri. As a start data will probably have to be collected on floppy disks.

**Site Name:** **El Max ( Wadil al Khamar)**

**Type of area**: Industrial area (Cement and refineries close to site).

**Objectives**: To measure air pollution in an industrial area where residents are impacted by local industrial sources.

**Parameters:** $SO_2$, BS, $PM_{10}$,TSP and dust fall (measured with sequential samplers, HiVol and dust fall bucket).

**Air intake**: About 6 m above the surface in a dense residential (village) area.

**Comments**: The site is operated for EMOHC by the local health office. Responsible for local inspections will be Mr Nasri Sikri. A room (wall) has to be prepared at the roof level. Samplers will also be located at the roof.

**Site Name:** **Abu el Darda**

**Type of area**: Small scale industries, urban

**Objectives**: To measure air pollution in a central urban area of Alexandria typically exposed to several small enterprises including smelting industries.

**Parameters:** $SO_2$, BS, $PM_{10}$, TSP and dust fall (measured with sequential samplers, HiVol and dust fall bucket).

**Air intake**: About 4 m above the surface at the roof of a security room at the entrance. Hivol and dust fall can be measured at a large flat roof.

**Comments**: The site has to be prepared with a better ladder to the roof level, and with access to the roof of the security room. A shelter will be lifted to this level. The station will be operated for EMOHC by the local health office. Responsible for local inspections will be Mr Nasri Sikri.

**Site Name:** **Ramler ( police st. Abdel Nasser Road)**

**Type of area**: Street canyon

**Objectives**: To measure air pollution continuously in a street canyon located in the central part of Alexandria.

**Parameters:** $NO_x$, NO, $SO_2$, $PM_{10}$, CO (measured with monitors).

**Air intake**: About 4 m above the street, the location has to be detailed later.

**Comments**: The site is suitable for its purpose. Agreements and contracts has to be prepared by EEAA/ Mon. lab. The site will be operated by the local health office for EMOHC. This site will be prepared for operation from the third phase of the project.

# 7 Monitoring sites in Cairo revisited

## 7.1 Tebbin institute

Dr. Mohammed Nassar showed us the institute where we met with Dr. Said, head of the institute, with Mr ElSayed Mohammed and Mr. ElSayed Ebeid (responsible for the monitoring stations at Tebbin). Air quality in Tebbin is only measured occasionally with the monitors ( typically once a week). They are calibrated using permeation tubes. TSP is measured once a week at different locations. Andersen samplers are brought around in the area with the mobile van.

Dust fall is measured with modified British Standard Gauges at 39 sites, and analysed for soluble ( 15-20%) and insoluble dust. Element composition is analysed; Pb, Ni, Cd, Ca, V, Cr etc. About 0.3% of the soluble dust is sulphate!

At the flat roof of the Tebbin institute there is a small house made of concrete (former toilet?). This room seems to be well suited for an air quality monitoring site. The entrance to the house is from the roof. The house includes three rooms of which two have small windows. A brick table in the largest room inside the entrance can be refurnished to hold a working bench.

The rooms must be cleaned. The water closets must be removed and the holes in the floor must be closed. The windows must be shut and a door with lock must be installed. A new table (not concrete) 80 cm deep must be built along the wall on top of the existing concrete table.

An air condition must be installed in the first room through the western wall but not above the table. Openings between the walls and the roof must be closed. Power and light must be installed in all three rooms.

The meteorological mast must be placed in the middle of the flat roof. It can be connected directly to the data logger in the shelter by electrical cables. The power supply to the room must contain a minimum of two 16 Ampere supply lines each with its own separate switch breakers.

## 7.2 Faculty of Medicine, Ein Shams University

The existing sequential sampler was placed in the computer room. The room is normally locked and not easy accessible. This and the noise from the pumps used by the monitors makes the room unsuitable for instrumentation.

A large flat roof is available on the same floor as the computer room. The edge of the roof is about 15 m from Lutfy al-Sayyed str. It is possible to lift a container/shelter from that road onto the roof. The meteorological mast could be placed on the roof of the computer room one floor above the shelter level. It can be connected directly to the data logger in the shelter by electrical cables. Electrical power must be supplied to the shelter.

## 7.3 Attaba

The existing sequential sampler was placed in a auditorium. The noise from the pumps used by the monitors and the possibility of visitors tampering with the instruments makes the room not suitable for instrumentation.

At the top of the stairs next to the exit to the flat roof there was an open space of approx. 3 $m^2$ (150 × 200 cm). There where a window on one wall. The height of the room was approx. 3 m and around the roof top there was a 0.5 m high wall. The walls and the roof where made of thick concrete. The area is suitable for housing a station.

Three walls must be built to close the room, one towards the stairs, one towards the floor at the top of the stairs and one wall towards the door. The exit to the roof must not be blocked. Electrical power must be supplied to the room (minimum two 16 Ampere supply lines each with its own separate switch breakers). An air condition must be installed. The window must be made impossible to open. Holes must be drilled through wall and roof as necessary.

## 7.4 Azbakeya

The existing sequential sampler was placed in an office. The noise from the pumps used by the monitors and the possibility of visitors tampering with the instruments makes the room not suitable for instrumentation.

Two doors situated in 40 cm deep recesses where leading to a small balcony (approx. 1 m wide) outside the room. The right half of the balcony was filled with rubbish. A small room for instrumentation could be built in front of the right balcony door inside the office.

Two walls extending from each side of the right recess into the room must be built so that the total depth of the recess becomes 90 cm. The front of the recess must be closed using two doors. The doors must have a lock. The walls and doors must be 2 m high. An air condition must be installed. Electrical power must be supplied to the room (minimum two 16 Ampere supply lines each with

its own separate switch breakers). The $PM_{10}$ monitor can be placed on the balcony. The rubbish on the balcony must be removed.

For future changes concerning any construction work or rebuilding allowance and contracts has to be prepared with the owner of the building, which was told not to be the Ministry of Health or local health authorities.

# 8 Field equipment

## 8.1 Type of equipment needed

The procurement papers for all air quality equipment needed for the programme was finalised. Various type of equipment must be purchased for the air pollution monitoring programme. The main elements are:

- Air quality monitors for gases.
- Air pollution samplers for suspended particles.
- Air pollution samplers for selected gases and dust fall gages.
- Meteorological equipment (automatic weather stations).
- Data loggers and data transfer systems.
- Telephone lines and modems.
- Computers in field and at the central data collection unit.
- Software for collecting data from the sites.
- Calibration equipment and spare parts.
- Additional analytical laboratory equipment; ion chromatograph.
- Monitoring station facilities; benches, shelves, air-condition, power, air intake facilities etc..

Some of the equipment already in use in Egypt can be used in the future air pollution monitoring programme. A discussion of quality of the sampling equipment inspected at the present EMOHC laboratory monitoring programme can be found in the site study reports.

## 8.2 Monitoring station facilities

At some of the monitoring sites selected for the future monitoring programme some of the facilities needed are already available. However, at many sites some rebuilding, cleaning, etc. have to be undertaken before the installation of expensive equipment. Some of this work has been specified in the tasks and duties listed for Dr. Nassar in Appendix D.

Most of this preparatory work contains construction of a wall, repairing the roof installing a door, closing of windows, cleaning and installation of Aircon. Also telephone lines and 220V power has to be installed in the monitoring rooms. The power supply must contain a minimum of two 16 Ampere supply lines each with its own separate switch breakers.

All these construction-work has to be cost estimated and entered into the contracts between the monitoring institutions and EEAA. Dr. Nassar has been given the responsibility to see that all these estimates are undertaken and presented to EIMP and to EEAA.

For the meteorological masts foundations for the guy wires has to be prepared with bolts to support the guy wire.

# Appendix A

# People we met

**Names and adresses in Egypt ( EIMP)**

**Office:**EIMP,3 Abdel Aziz Selim street
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Dr. Salah Hafez (Chairman)
Dr. Mohamed el Zarka ( Jans counterpart)
Dr. Abdil Latif Hafez ( Air Quality respons.)
Ms Heba Mohammed Adly, (Env. researcher).
Mrs Hoda Hanaffi ( head of GIS)
Mr Mohammed Saki , and Omar Hussein (GIS)

**Env.Mon. Centre** Tayar Fecri Street,
OmalCity, EMBABA (at E:Fever inst.)
Dr. Seham M.H. Hendy (head) tel: 311 8978
Mr. Mohammed (J Refaye) El Amawi ( AQ) tel: 311 9691

**TIMS**, Tabbin- Helwan (tel:5010170)
Prof. Saaid, and dr. Hassan Hamad
Prof. Saied El Khalil

**NRC;** Shari el Tahrir, Dokki Square,
prof. Mahmoud Nasrallah, tel 3537299, Fax 3370931

**JICA Minilabs**. Mohandessin.tel 3601839
Dr Mawaheb Abov el Azm

**Institute of Graduate Studies and Research**
Univ of Alexandria
Prof M El-Raey, tel:422 7688
Fax oo 203 421 5792

**High Institute of Public Health, Univ. Alexandria**
Dr Abdel Aziz El-Dakhakhny
Tel: 846525
Ms. Marvet Amin ( models) Fax: 421 5792

**President hotel**. 22 Taha Hussein street
Zamalek, tel. 202 3400718
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**Saied E. Khalil**
Director

Tabbin Institute For Metallurgical Studies

Tel. & Fax : 5010170 - 5010171 Cairo

Tabbin Institute For Metallurgical Studies
Central Laboratory For the Studies of Industrial Pollution

*Physicist* / **EL SAYED M. EBEID**
MSc. AIR POLLUTION
HEAD OF AIR LAB.

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# Appendix B

# Procurement phase, man-hours at NILU

EIMP

**Environmental Information and Monitoring Programme**
**3 Abdil Aziz Selim street**
**Mohandessin, Cairo, Egypt**
**Tel/Fax: +20 2 361 5085**

# Note

**To: Jan Hassing**
**Copy:**
**From Bjarne Sivertsen**
**Date: 5 October 1996**

**Procurement phase, man-hours at NILU**

During the procurement phase of the project more man-hours have been spent at NILU than foreseen in the original plans presented for the first phase of the project. To effectively fulfil the objectives of this phase of the project, the most optimal procedures have been followed. Some of the reasons for the high number of home office man-hours have been:

- The procurement procedures and the investigations of various types of instrument specifications could best be undertaken at the NILU offices, where expertise was available,
- the evaluation of instruments and equipment to be used in Egypt was based on site visits already undertaken in Egypt in May-June 1996,
- the list of potential deliverers was available at NILU.

To finalise the first phase procurement tasks we have agreed with the procurement officer that NILUs technical evaluation of offers and bidders will be undertaken at NILU, and thereafter co-ordinated by the commercial evaluation undertaken by COWI.

This means that we have to spend more hours in the home office than indicated in the original plans to finalize this part of the project.

The kick-off and the start of the air quality measuring programme has also been postponed compared to original plans. This again has lead to a delayed training seminar and the "on the job training" courses.

As soon as the instruments and the equipment has been purchased more time has to be spent in Egypt. Detailed plans for this second phase of the project will be established during November 1996.

**Environmental Information**
**and Monitoring Programme**
**3 Abdil Aziz Selim street**
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**Tel/Fax: +20 2 361 5085**

# Note

**To: Jan Hassing**
**Copy:**
**From Bjarne Sivertsen**
**Date: 11 October 1996**

## Air Quality Monitoring Programme

**The need for open air quality data,**
**The data must be available to all!!**

In several discussions it has been stressed that environmental data in Egypt is normally not open and easily available. There are reasons that this kind of information has not been made available to the public or to institutions interested in this kind of information.

It has also been questioned whether the new EIMP network data will ever be open information.

I like to stress at this point in time, that some of the incentives for co-operation between different institutions that will improve and supply the national EEAA air quality monitoring network and data base, is the possibility for obtaining data and information from the complete network.

It is thus of utmost importance that it will be declared by EEAA officially and by the steering committee/ working groups belonging to the project, that the information collected by this network will be open to all interested users and (of course) to the public! In the future some of these data could be published on a daily bases on the official network channels, as it is done in most western countries.

I will prefer that the EIMP staff use all opportunities to underline the importance of an open environmental data base.

# Appendix C

# Meeting and note from Prof. Nasralla

**Notes on Air poll reference Lab.**
**Dr. M.M. Nasralla**

---

1. I undustood from the document that the Ref. lab will periodically calibrate the monitoring instrumentation in the field. Is the jop of the ref lab will be calibrating the monitoring instruments for the monitoring institute or the lab will as well do the jop as refrence lab for QC and to condut training... etc.

2. There is nothing mentioned in the recieved part of the document about the monitoring instrumentation, pollutants to be monitoned, types of monitors..etc. What are the types and quantities of monitors to be located in the ref. lab. I believe at least one of each should be supplied to the ref. lab. (A complete set of monitoring instrumentation)

3. Nothing has been mentioned about particulate monitors and their calibrators.

4. Weighing balance and a balance table as well as filters conditioner are needed for particulate...

Thank you.

Your sincerely

Prof.Dr. Mahmoud Nasralla

5. NRC will also serve as Ref. Lab. for air emissions monitoring (but this role is not descibed)

---

Nasrallah: NRC ext. 4102
→ Tel: 3371499
3371433

**From : Dr. M.M. Nasralla**
**To : Dr. Bjian Steverson**

**Comments on the Automatic Monitoring progrm and Ref. Lab.**

I **Automatic Stations**

1- Two stations are proposed to represent the urban centre and one canyon (urban area). I beieve that the two stations of Attaba and Tahreer should be reduced to only one station preferably at Attaba. Meteoralogy should also be monitored at that station.

2- TSP is an important parameter which has been missed should be monitored at six stations representing 2 residential arees, 2-industrial, 1-urban , 1-residrstial/industrial and 1-background area. This is because of the emissions of particulates from several man-made processes and the resuspended dust leading to the presence of big particles more than 10 micron. Moreover, law 4 for 1994 set a standard for TSP.

3- No need to manitor meteorology at Abbassia (Faculty of Medicine). The site is very close to Met station at the General Directorate of Met.

4- TSP and PMIO are important to be monitored at Nasr City

5- Carbon monoxide and Hc parameters are very important to be monitored at the urban station (Attaba) and at least one or two of the residential areas (e.g. Nasr City or Maadi)

6- Maadi is a downwind station. Therefore, ozone should be monitored at Maadi station. TSP and PM10 are also to be added, it is close to the indastrial area of Helwan.

7- The pyramids station is not a background station. If this site is necessary, it should monitor $SO_2$ because it has deteriorating effects on monuments.

8- The background station should be chosen to the north of the city (e.g. Cairo - Ismailia Road).

9- Giza station, should be moved to a site close to Giza Square or Dokki to represent the residential area.

**II Data Handling and reporting** :

There is lack of experience in Imbaba centre and EEAA to handle the monitoring data and to produce annual reports in the time being. Therefore, it is recommended to work out a special arrangement for the first five years with the Air Quaity Improvent Research unit of the National Research Centre to produce the annual report about air quality in Cairo and to report for EEAA.

This arrangement is necessary at least for the first five years until monitoring institutes upgrade their experience and capability to produce the annual report which needs expericnce in data handling, meteorology, modelling, sources .....etc.

**III Semiautomatic Stations** :

Stations which will use semiautomatic and dynamic monitors (wet methods) have not been included and methods are not mentioned in the plan.

**IV Reference laboratory shoud do the following** :

1 - Periodical calibration and check the caibration in the field as well as the calibration in the lab.
2 - Analyse for lead and periodic samples of the wet methods to ensure the validation of the results.
3 - Field QC through setting same instruments parallel to those monitoring at the station (both automatic and other samplers).
4 - Data validation and representetivness.
5 - Reference lab should conduct auditing and produce annual auditing report.
6 - Under special arrangements the air quality improvement unit can produce the annual report on air quality.
7 - Training of the staff of the monitoring institutions and others.

**Instraumentation and equipment for ref lab** :

01 - Calibration systems for all automatic monitors.
02 - Set of calibration bottles (mixture of gases).
03 - Set of the all monitors to be fixed in the lab.
04 - Set of particulate samplers (TSP and PM10) and calibration kit.
05 - Another set of automatic monitors and the other

samplers (Particulats and semioutomatic) to be moved for QC in the field and small mobile unit to move these instruments.

06 - A small car to move between the lab, the field for periodic calibration, auditing, and other work.

07 - Lab instruments and chemicals

- a - ~~Weighing balance~~.
- b - Drying oven. for HV sampler filters (TSP filters)
- c - Muffle furnace
- d - ~~Stirrer.~~
- e - Spectrophotometer. ??
- f - Dish washer.
- g - Refrigerator.
- h - ~~Hot plates.~~
- i - Water bath.
- j - Glass ware and reagents.
- k - Ph. meter.
- L - Voltage regulator.
- m - Reference material.
- n - Lab water purification (to produce destilled water)

08 - Desks, chairs, tables, book shelves, Lookers.

09 - Computer, PC and printer.

10 - Air condioners.

11 - Lab control instruments e.g. thermometers, pressure, humidity ..... etc.

12 - Manuals and books.

13 - Spare parts and kits for maintence and small services.

14 - Data aquisition and control system.

## Personell :

01 - Head of air reference Lab.

02 - 3 Supervisors (Ph.D. or M.Sc.) for field work, Lab calibration and Lab chemical analysis.

03 - 1 Data handling Engineer.

04 - 5 Young scientists and analytical chemists (M.Sc. or B.Sc.).

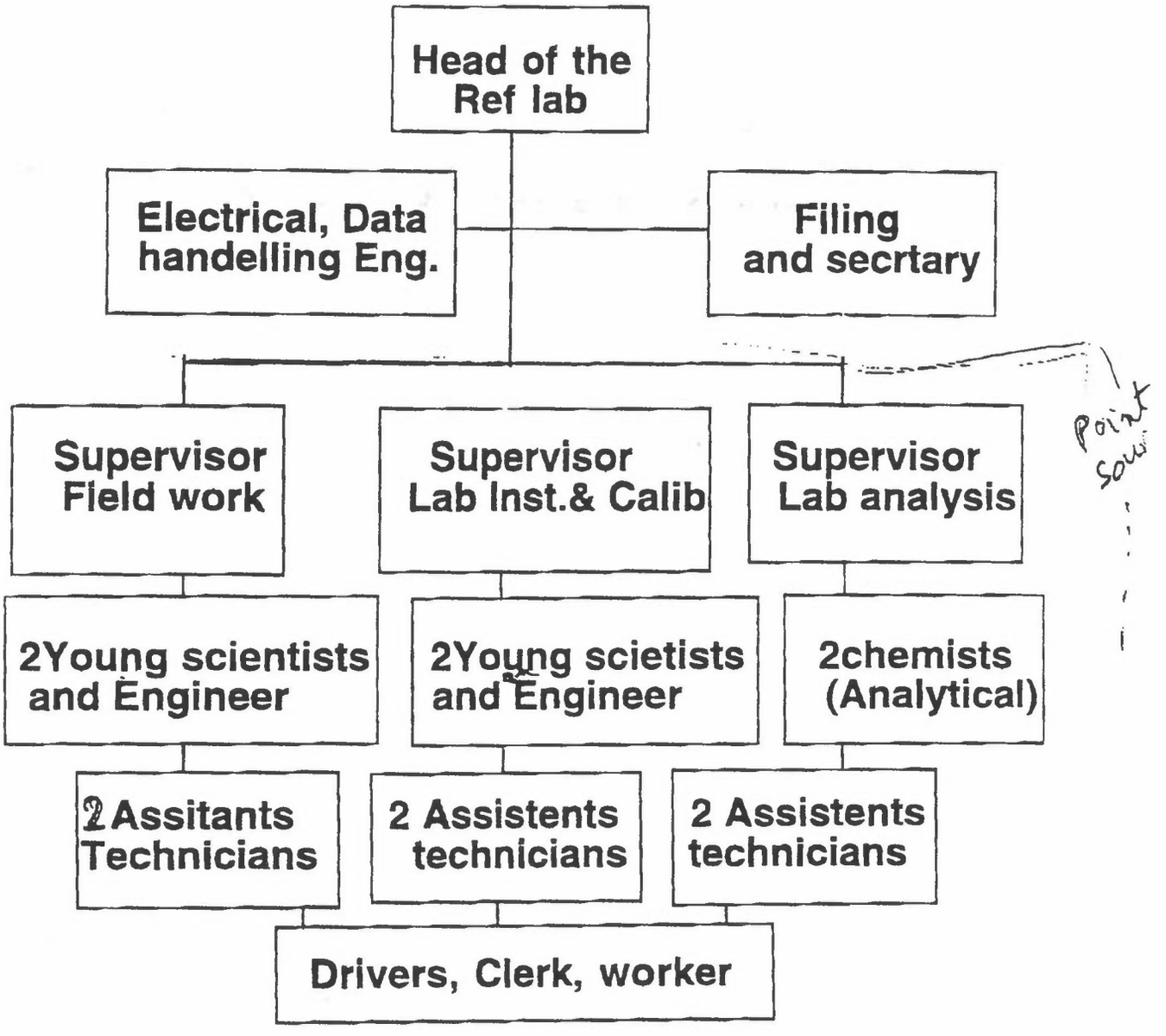
05 - Electrical and electronic engineer (Instrumentation).

06 - 5 Assistants (technicians).

07 - Filing and secretarial work.

08 - Drivers.

09 - One, Clerk work. 10- One worker.


Head of the Ref lab
Electrical, Data handelling Eng.
Filing and secrtary
Supervisor Field work
Supervisor Lab Inst.& Calib
Supervisor Lab analysis
2Young scientists and Engineer
2Young scietists and Engineer
2chemists (Analytical)
2 Assitants Technicians
2 Assistents technicians
2 Assistents technicians
Drivers, Clerk, worker

Air Ref. Lab

EIMP
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Mohandessin, Cairo, Egypt
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# Note

**To: Dr M.M. Nasralla**
**Copy: Jan Hassing**
**From Bjarne Sivertsen**
**Date: 12 November 1996**

## Comments to monitoring programme

Referring to your note concerning the air quality monitoring programme for Egypt, I can give you the following feedback.

### Automatic stations

**1.** I agree that the two urban stations could be merged into one at Attaba. This may also be the case. The reason for Tahrir sq. was that Atomic Energy is planning a site here, and that EEAA could benefit from a co-operation to obtain these results. The site will also be representative for the kilometre scale pollution in central Cairo.

**2.** We agree that TSP is an important parameter. However, PM10 (and PM 2.5) will be even more important relative to health impact and air quality guideline values in the future. My plan was to use as many as possible of the existing Anderson type TSP samplers that is already present in Egypt. We are in addition purchasing 5 new ones!!

**3.** I believe that we still need to measure meteorology at Abbasia. The reason is that I do not know the QA procedures at Met Office, they do not measure turbulence and we need on-line information of meteorology to explain the air quality. Meteorology is more important in a modern surveillance programme than people seem to realise!!!!!

4. PM10 and TSP has already been added for Nasr City.

5. NMHC and CO is mainly linked to traffic air pollution, and has therefor been concentrated at traffic related sites. The highest values will be found there. VOC may also be interesting in residential and background areas, and we are planning to collect individual samples to be analysed on a GC ( occasionally). CO relates when it comes to AQ guidelines only to traffic ( except very close to some industries and in work atmospheres).

6. I agree that ozone could be measured at Maadi ( or maybe even better at Hawamdia). We will see what we can do with this comment...

7. I agree that the pyramids station should measure all air pollutants relevant for stone deterioration. This may be possible by using sequential samplers or inexpensive passive samplers. We do not need continuous records to consider this type of impact.

8. I will have to look at Ismailia road station as a background site, when I visit Cairo next time

9. The Cairo University at Giza was selected due to the a request from the University to participate and support data to the monitoring programme. I had at that time selected NRC as a possible sampling site...

**Data handling and reporting**

We are very well aware of the lack of experience at Embaba lab. Training and the need for hiring new personnel is thus essential. We have also put large efforts into the training programme all the way through the project..
I have not considered any arrangement with NRC in this respect, but it is clearly something that we could consider. Also concerning the annual report, the contents and development of this lies within the scope of the training programme.

**Semiautomatic samplers**

This type of measurement equipment was not originally a part of the establishment of a monitoring system for Egypt. However, as we have seen what has been used and what is available, we have assumed that some stations also in the future will be equipped with this type of equipment.
This is also the reason that we will purchase a new ion chromatograph. Chapter 5.4.2. indicate some of the possible sites for this type of equipment. Further details will have to be evaluated later.

**Reference lab**

Most of what is being commented concerning the Ref Lab I agree in. Instruments and chemicals will have to be discussed with Ulla Lund.
Your suggestions concerning personnel and staff seem adequate. However, this will also be subject for discussions among the team leaders in November, and I will report on further comments to this later.

---

Finally I would like to thank you for all your valuable comments, and I look forward to meeting you next time in Cairo.

# Appendix D

# Meetings with Dr. Mohammed Nassar

a) CV
b) Tasks and duties

NATIONALITY..: EGYPTIAN

BIRTH DATE...: 9-1-1946

EDUCATION.....:B.Sc. CAIRO UNIVERSITY -1969- CHEMISTRY - PHYSICS

PRESENT POST.: DIRECTOR OF THE NATIONAL NETWORK FOR AIR POLLUTION MONITORING AND FINE ANALYSIS, QUALITY CONTROL UNIT
* ENVIRONMENTAL & OCCUPATIONAL HEALTH CENTER
MINISTRY OF HEALTH

DUTIES & RESPONSIBILITIES :

1- THE ACTING FOCAL POINT FOR GEMS,AIR /EGYPT

2- RUNNING OF THE ENVIRONMENTAL IMPACT ASSESSMENT INFORMATION UNIT AT E.O.H.C. EMBABA

3- SUPERVISOR OF:

A- OPERATION , CALIBRATION AND MAINTENANCE OF MONITORING EQUIPMENTS AT THE NATIONAL LEVEL

C- COLLECTION , TABULATION AND STATISTICAL TREATMENT OF MONITORING DATA AT THE NATIONAL LEVEL

D- THE CENTRAL ANALYTICAL LABORATORY AT E.O.H.C.EMBABA

E- THE CENTRAL ANALYTICAL QUALITY ASSURANCE UNIT AT E.O.H.C. EMABA

PREVIOUS POST: 1979 - 1987 HEAD INSTRUMENTAL ANALYSIS UNIT
ENVIRONMENTAL & OCCUPATIONAL HEALTH CENTER,
MINISTRY OF HEALTH

1970 - 1979 CHEMIST - SANITARY CHEMISTRY DEPT.
CENTRAL LABORATORIES M.O.H.

PROFESSIONAL EXPERIENCE :

1978 WORKSHOP - HEALTH AND MEDICAL LABORATORY MANAGEMENT CENTER FOR DISEASE CONTROL U.S.A

1980 6 MONTH TRAINING COURSE ON ANALYTICAL METHODS FOR PESTICIDES RESIDUES - NETHERLANDS - W.H.O

MOHAMED NASSAR
Tel 3515174 ← Tel home.
after 15th

* From 9/4/95 till now
Environmental study on air pollution in Helwan
Tabbin Institute For Metallurgical Studies, Ministry of Industry.
Study on toxic & Carcinogenic substance
in great Cairo. National research Centre

1982 SEMINAR ON ENVIRONMENTAL MANAGEMENT
NATIONAL INSTITUTES OF HEALTH U.S.A

1983 ONE MONTH TRAINING COURSE ON INDUSTRIAL CONTROL
UNIVERSITY OF TECHNOLOGY - FINLAND - W.H.O

1985 TWO WEEKS TRAINING COURSE ON INSTRUMENTAL ANALYSIS
OF METALS - WEST GERMANY

1987 ONE WEEK TRAINING COURSE ON HUMAN RESOURCES
DEVELOPMENT - CAIRO - W.H.O.

1988 * ONE MONTH TRAINING COURSE ON AIR POLLUTION CONTROL
FEDERAL ENVIRONMENTAL AGENCY - WEST GERMANY
* FIRST CONSULTATIVE GROUP MEETING ON CEHANET
AMMAN - JORDAN

1989 * WORKSHOP ENVIRONMENTAL HEALTH MANAGEMENT IN
EMERGENCIES - CHEA -AMMAN - JORDAN
* TWO WEEKS TRAINING COURSE EXECUTIVE DEVELOPMENT
PROGRAM - AMERICAN UNIVERSITY IN CAIRO

1990 TWO WEEKS CONSULTATIVE GROUP MEETING -ENVIRONMENTAL
INFORMATION - E.P.A. - U.S.A

1991 TWO WEEKS WORKSHOP ON CHLORINATED HYDROCARBONS
MONACO

1992 ONE MONTH - ENVIRONMENTAL MUTATION AND ORGANIC AND
INORGANIC MICROPOLLUTION - INSTITUTE FOR WATER, SOIL
AND AIR HYGIENE OF THE FEDERAL HEALTH OFFICE -
GERMANY.

SIGNATURE. ...

8/4/95

**Environmental Information and Monitoring Programme**
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**Mohandessin, Cairo, Egypt**
**Tel/Fax: +20 2 361 5085**

# Note

**To:** **Dr. Mohamed Nassar**
**Copy:** **Jan Hassing**
**From:** **Bjarne Sivertsen**
**Date:** **13 October 1996**

## Air Quality Monitoring Programme, Tasks and duties , Oct-Nov 1996

As the EEAA counterpart for the EIMP air quality monitoring programme task manager, there are several tasks and duties that have to be undertaken during the next few months.

The following list should be considered a check list for tasks that have to be fulfilled before the monitoring programme is being installed and the training can start in Egypt. The list is not organised in any priority.

- Be familiar with the organisation chart proposed, included job descriptions for the staff at the monitoring laboratory (Embaba).
- Check personnel at Embaba. Do they fulfil requirements?, -what kind of personnel is needed? can these be obtained?
- Start the process advertising for new relevant experts.
- Verify that agreements between EEAA and Monitor lab. has been developed and signed.
- Be familiar with data collection scheme and description of data flow. Remember all environmental information collected in the EIMP programme on air quality is open public information.
- Follow up the task given to Mrs. Hoda/Omar Hussein on digitalizing maps and include UTM reference system ( see note)
- Read procurement document on air quality instrumentation.
- What is the status on an agreement with Atomic Energy Authority??
- Participate in Working Group meeting at EIMP on 21 November 1996.
- Prepare meeting with meteorological service concerning:
  Meteorological/climatological data,
  Ozone measurements and
  use of site at Giza?+

- Are there other possible sites for ozone measurements at Giza pyramids (away from roads..)

- Prepare building and construction work at different sites:

1. **Embaba,** sampling room at roof; a wall with a door that can be locked has to be built on the roof top room. Telephone line and power has to be made available in the room.
2. Two rooms identified as a computer room and as a repair/storage room in the Embaba laboratory building have to cleaned and clarified before the end of February 1997.
3. **Samoha, Alexandria**, at the health office roof room; a new roof and some improvements have to be undertaken at the office to be used for the sampling station.
4. At the **Emergency station El-Saaf, Alexandria**, a shelter has to be constructed at the roof of the building closest to the road. A sketch has been made of the layout.
5. At the site in **El-Max area**, Alexandria west, a wall has to be constructed ( with a door that can be locked) in the northern room at the roof level. Intakes for $SO_2$ through the wall and $PM_{10}$ through the roof has to be prepared.
6. **At Abu el-Darda , Alexandria**,. the steep ladder makes the access to the roof difficult, and this should be replaced by a better stair leading to the roof from inside the building backyard. A shelter/container can be lifted to the 3 m high roof of the security room at the entrance. This roof has to be prepared with a ladder.
7. **At Tebbin institute:**
   Prepare the small room at the roof of the Tebbin Instirute. Clean- door - close windows- air.con. - intake for gas samples and $PM_{10}$ samples. The room need telephone and power.At the flat roof of the Tebbin institute there is a small house made of concrete (former toilet?).

   This room seems to be well suited for an air quality monitoring site. The entrance to the house is from the roof. The house includes three rooms of which two have small windows. A brick table in the largest room inside the entrance can be refurnished to hold a working bench.

   The rooms must ble cleaned. The water closets must be removed and the holes in the floor must be closed. The windows must be shut and a door with lock must be installed. A new table (not concrete) 80 cm deep must be built along the wall on top of the existing concrete table.

An air condition must be installed in the first room through the western wall but not above the table. Openings between the walls and the roof must be closed. Power and light must be installed in all three rooms.
Telephone lines must be made available in one room.

The meteorological mast must be placed in the middle of the flat roof. It can be connected directly to the data logger in the shelter by electrical cables. The power supply to the room must contain a minimum of two 16 Ampere supply lines each with its own separate switch breakers.

**8: At Attaba:**
At the top of the stairs next to the exit to the flat roof there was an open space of approx. 3 $m^2$ (150 x 200 cm). There where a window on one wall. The height of the room was approx. 3 m and around the roof top there was a 0.5 m high wall. The walls and the roof where made of thick concrete. The area is suitable for housing a station.

Three walls must be built to close the room, one towards the stairs, one towards the floor at the top of the stairs and one wall towards the door. The exit to the roof must not be blocked. Electrical power must be supplied to the room (minimum two 16 Ampere supply lines each with its own separate switch breakers). An air condition must be installed. The window must be made impossible to open. Holes must be drilled through wall and roof as necessary.

**9: At Azbakeya**
Two doors situated in 40 cm deep recesses where leading to a small balcony (approx. 1 m wide) outside the room. The right half of the balcony was filled with rubbish. A small room for instrumentation could be built in front of the right balcony door inside the office.

Two walls extending from each side of the right recess into the room must be built so that the total depth of the recess becomes 90 cm. The front of the recess must be closed using two doors. The doors must have a lock. The walls and doors must be 2 m high. An air condition must be installed. Electrical power must be supplied to the room (minimum two 16 Ampere supply lines each with its own separate switch breakers). The $PM_{10}$ monitor can be placed on the balcony. The rubbish on the balcony must be removed.

For future changes concerning any construction work or rebuilding allowance and contracts has to be prepared with the ownert of the building, which was told to not be the Ministry of Health or local health authorities.

Several of the above mentioned check points can be undertaken before the working group meeting on 21 November 1996.

The EIMP air quality team leader will be back in Cairo on 18 November. A status report for the work including upgrading of the check list will be prepared during that week of November.

# Appendix E

# Siting reports from Alexandria

## Air quality measurement sites in Alexandria

| Name | Area type | UTM coordinated | | Parameters | Instrument |
|---|---|---|---|---|---|
| | | X | Y | | |
| ElSaaf | Urban, open | 777,120 | 3,454,947 | SO2, NOx, PM10, TSP | Monitors |
| Samoha | Resid, industries | 779,779 | 3,456,249 | SO2, NOx, PM10, TSP | Monitors |
| IGSR, Alex univ. | Urban, road side | 778,149 | 3,455,800 | NOx, PM10, SO2, TSP | Monitors |
| | | | | CO, NMHC, meteorol. | AWS |
| ElMax | Industries. | 770,889 | 3,448,665 | SO2, NO2, PM10, TSP | Samplers |
| Abu elDarda | Resid. industries | 775,622 | 3,454,547 | SO2, NO2, PM10, TSP | Samplers |
| Ramler | Street canyon | | | NOx, PM10,SO2, TSP | Monitors |

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: Abu El Darda, Alexandria**
**Coordinates: UTM: 775 622, 3454 547 (map 35R)**

**Access/ availability**: Easy to access through narrow streets with small scale.

**Buildings and rooms available**:. Laboratories for hygiene and water samples available. Also a large flat roof, which can only be accesses climbing a steel ladder.

**Area description**: Urban with several small scale industries.

**Local sources:** Many small industries; smelters and work shops and some traffic close to the station.

**Representativity:** Representative for backyard sampling inside industrialized area. Potentially some small emission sources close to the air intake. The site is not perfect for a kilometer scale network.

**Parameters measured:** $SO_2$ , black smoke (BS) and a high vol. sampler ( not operated at the time, very dirty not well maintained!!).

**Data quality:** Presently uncertain. TSP data must be poor. Some $SO_2$ and BS data are available.

**Measurement equipment:** The old type sequential sampler from Glass Development Limited in England for 24 h average sampling of $SO_2$ and black smoke. Anderson type sampler ( from General Metal Works Inc.) for TSP was a wreck, can be scrapped.

**Infrastructure: Power:** 220 V available in the laboratory and at the roof.
**Telephone lines**: No telephone lines available.
**Sampler/monitor locations**: On shelf in the laboratory.
**Air intake**: $SO_2$ and BS intak in window not away from the wall. Impact from dust in the window?? TSP on the roof on open space.

**Personnel**: The person responsible is Mr Nasri Sikri (Chemist , B.Sc.) together with other chemists that may be appointed to collect samples.

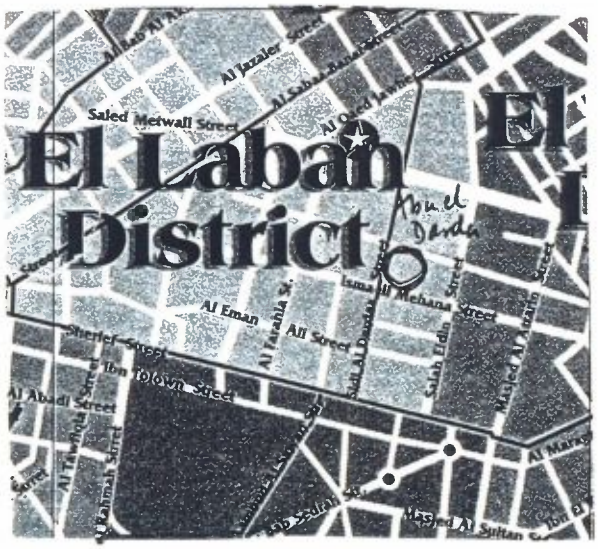
**Future monitoring station**:
The site is not perfect as a general air quality station for urban Alexandria. It will be given second priority and considered as a future site after the other 5 stations in Alexandria have been put into operation.

The roof could be used for a hi vol station (like today) especially for element analysis. The steep ladder makes the access to the roof difficult, and this should have been replaced by a better stair leading to the roof from inside.

A future $SO_2$ and BS sampler for 24 h sampling should be moved to the second floor of the chemistry lab building. Alternatively a shelter/container can be lifted to the 3 m high roof of the security room at the entrance. The shelter will contain a $PM_{10}$ and a $SO_2$ and BS sampler for 24 h sampling. The $PM_{10}$ sampling will be done dayly or every sixth day. Alternatively the shelter can contain a $PM_{10}$ and a $SO_2$ monitor for 1h average sampling. In this case BS will not be sampled. The TSP sampler will remain on the roof.

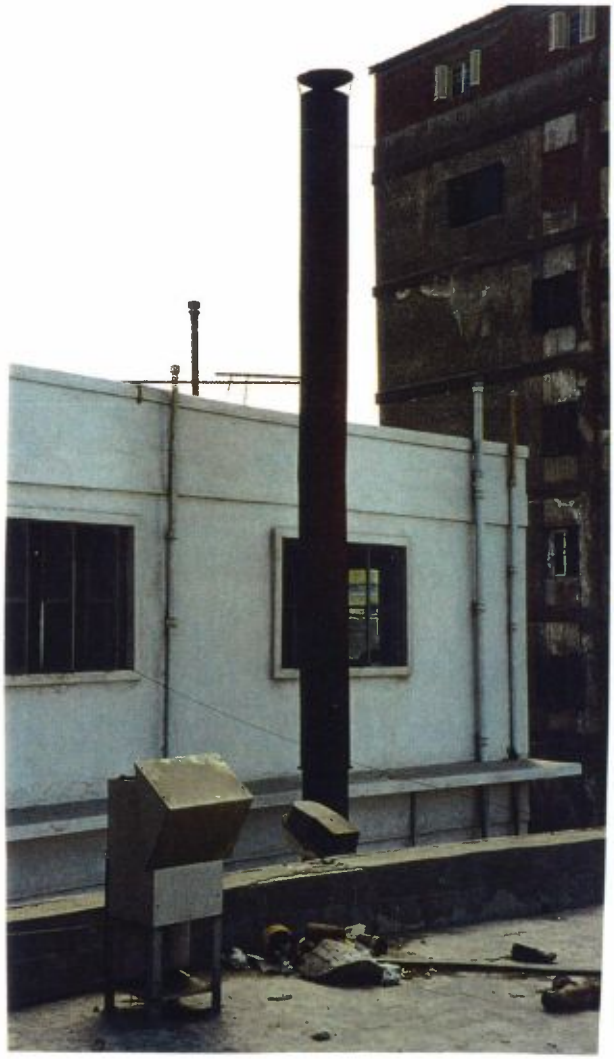
# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: Abu El Darda, Alexandria**
**Coordinates: UTM: 775 622, 3454 547 (map 35R)**





Possible shelter on top of the security room at the entrance.



Hi Volon roof.

Chemistry lab building

Opposite side of entrance.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: El Max ( Wadil al Khamar), Alexandria**
**Co-ordinates: UTM: 770 889, 3445 8 665 (map 35R)**

**Access/ availability**: Have to know the way through narrow streets. Easy parking.

**Buildings and rooms available**: The $SO_2$ /BS sampler was located in the corner of a very dusty meeting room of the Medical Centre. Not well maintained. They started cleaning the room while we were there.

**Area description**: Industrial area ("random area"?) with people living in the el Max residential area.

**Local sources:** Cement industry (600 m away in the predominant wind direction) and refinary about 1 km to the ENE.

**Representativity:** Representative for residents downwind from industrial emissions.

**Parameters measured:** Presently $SO_2$ , black smoke (BS) and TSP is being measured.

**Data quality:** Assumed to be fair ( claimed to contain 300 good 24h data a year). The TSP sampler on the roof looked Okay.

**Measurement equipment:** The old type sequential sampler from Glass Development Limited in England for 24 h average sampling of $SO_2$ and black smoke. Anderson type sampler ( from General Metal Works Inc.) for TSP located on the roof.

**Infrastructure: Power:** 220 V available.
**Telephone lines**: No telephone lines available. .
**Sampler/monitor locations**: In a corner of the dusty meeting room.
**Air intake**: $SO_2$ and BS intake today through the window.

**Personnel**: The person responsible is Mr Nasri Sikri (Chemist , B.Sc.) together with other chemists that may be appointed to collect samples.

**Future monitoring station**: For the future monitoring site a wall will be built in a room on the roof (second floor) level. Air intake will be prepared in from the northern side of the building about 6 m above the surface. Intake to $PM_{10}$ sampler through the roof. TSP sampler may be kept on the roof (monthly element analyses) together with dust fall sampler.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: El Max ( Wadil al Khamar), Alexandria**
**Co-ordinates: UTM: 770 889, 3445 8 665 (map 35R)**


Stacks

Sequential sampler

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: El Saaf ( Emergency station), Alexandria**
**Co-ordinates: UTM: 777 120, 3454 947 (map 35R)**

**Access/ availability**: Easy to access from a large open square.

**Buildings and rooms available**:. One small room next to the auditorium is being used for the $SO_2$ /BS sampler. The room has to be passed to access the toilets. Not good for monitors.

**Area description**: Urban/ Central Alexandria open area representative for the kilometre scale.

**Local sources:** Traffic and the railway station a few hundred metres to the south.

**Representativity:** Representative for the kilometre scale central urban Alexandria.

**Parameters measured:** Presently $SO_2$ , black smoke (BS) and TSP is being measured.

**Data quality:** Assumed to be good ( claimed to contain 300 good 24h data a year). The TSP sampler looked Okay.

**Measurement equipment:** The old type sequential sampler from Glass Development Limited in England for 24 h average sampling of $SO_2$ and black smoke. Anderson type sampler ( from General Metal Works Inc.) for TSP located outside the room on the roof.

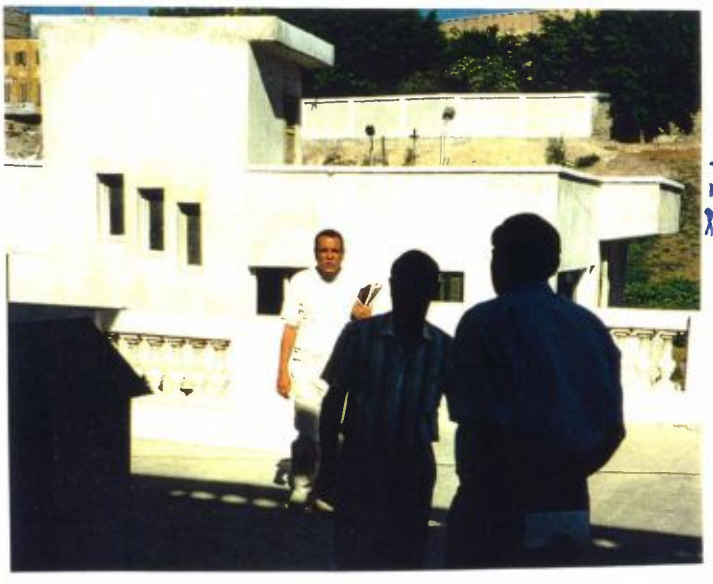
**Infrastructure: Power:** 220 V available also at future site.
**Telephone lines**: No telephone lines available.
**Sampler/monitor locations**: On shelf in the small room today.
**Air intake**: $SO_2$ and BS intake today through the wall at the small room TSP on the roof outside the room.

**Personnel**: The person responsible is Mr Nasri Sikri (Chemist , B.Sc.).

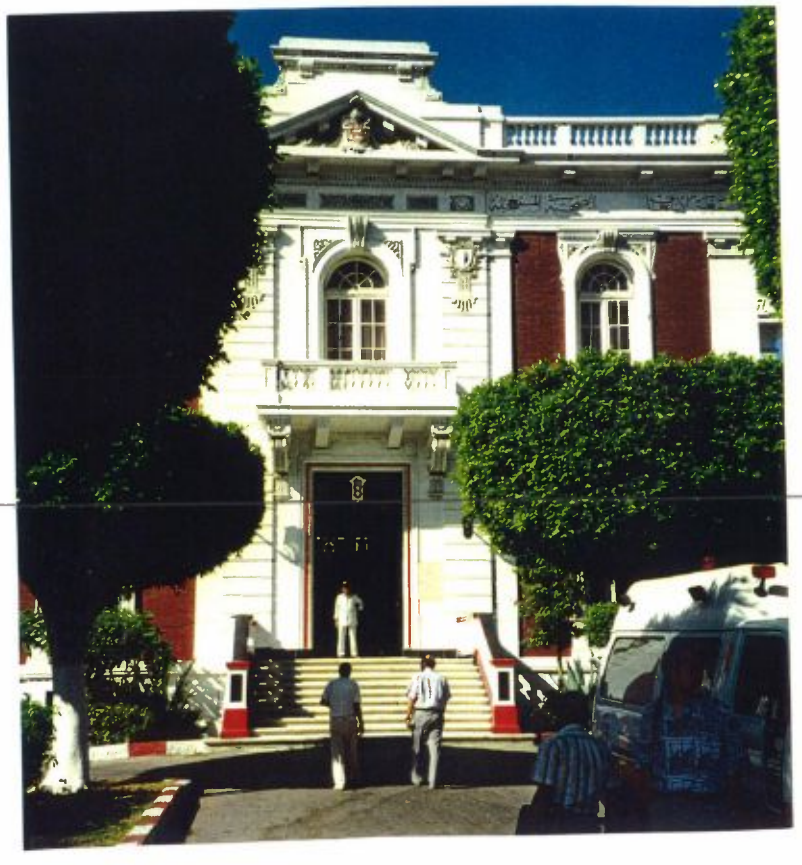
**Future monitoring station**: For the future monitoring site a shelter will be built on a neighbouring building ( USAID Alex Health Project). Alternatively it will be possible to lift a shelter/container to the roof. The future intake will be 10 m above the ground on the inside above the backyard. A sketch of the room layout is available. The roof outside this new room/shelter could be used for a hi vol station.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: El Saaf ( Emergency station), Alexandria**
**Co-ordinates: UTM: 777 120, 3454 947 (map 35R)**

New location



# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: 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**:Various air pollutants are measured from time to time. Some old British monitors are available but not operated presently. Met. sation at the roof

**Area description**: Urban centre, road side station at most trafficated road in Alex.

**Local sources:** Traffic.

**Representativity:** Representative for urban centra and large trafficated road .

**Parameters measured:** Presently only meteorology and radioactivity (for Atomic Energy Auth.) is being measured.

**Data quality:** presently unknown...

**Measurement equipment:** Campbell Scientific Ltd. AWS on 3m pole for wind, temp, rel hum., radiation and temperature. AA? monitors for $SO_2$ ,Nox, CO, $CO_2$ etc..

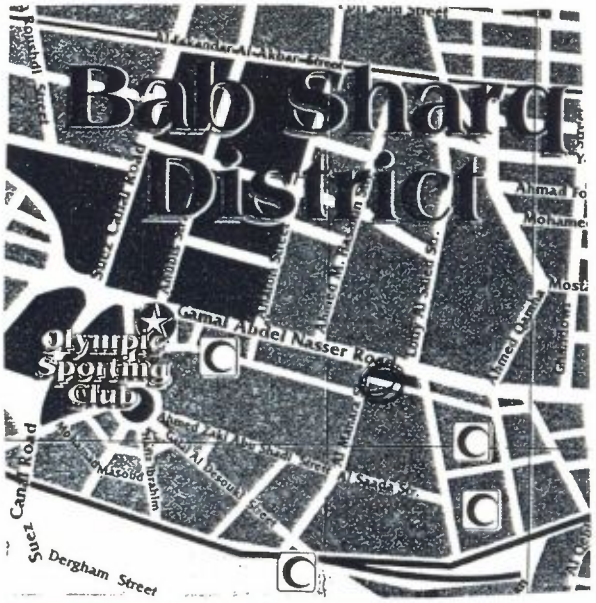
**Infrastructure: Power:** 220 V available.
**Telephone lines**: Telephone lines will be available.
**Sampler/monitor locations**: To day a chem. lab is being used, and the roof for meteorology.
**Air intake**: Through the window of the lab..

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

**Future monitoring station**: For the future monitoring site a shelter/container will be lifted to the 3 m high roof of the security room at the entrance. The shelter will contain NOx, PM10, $SO_2$ ,CO, NMHC. Air intake towards north east
A new AWS will be located on a 10 m mast on the roof ( 6th floor) with radio communication data transfer to the logger/modem in the shelter.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: IGSR Univ. of Alexandria ( Inst. Graduate Studies and Research)**
**Co-ordinates: UTM: 778 149, 3455 800 (map 35R)**




View from Met. site

Existing Met. station

Possible shelter on top of security building.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: Samoha, Alexandria**
**Co-ordinates:. UTM: 779 779, 3456 249 (map 35R)**

**Access/ availability**: Easy to access through narrow streets.

**Buildings and rooms available**:. A small building , office room build on top of the second floor roof.

**Area description**: Residential/ small industries ( textile).

**Local sources:** Textile industries and traffic.

**Representativity:** Representative for the southern central parts of Alexandria-

**Parameters measured:** $SO_2$ , black smoke (BS) and a high vol. sampler

**Data quality:** Seems good. Data were available, and the instruments looked well kept.

**Measurement equipment:** The old type sequential sampler from Glass Development Limited in England for 24 h average sampling of $SO_2$ and black smoke. Anderson type sampler ( from General Metal Works Inc.) for TSP.

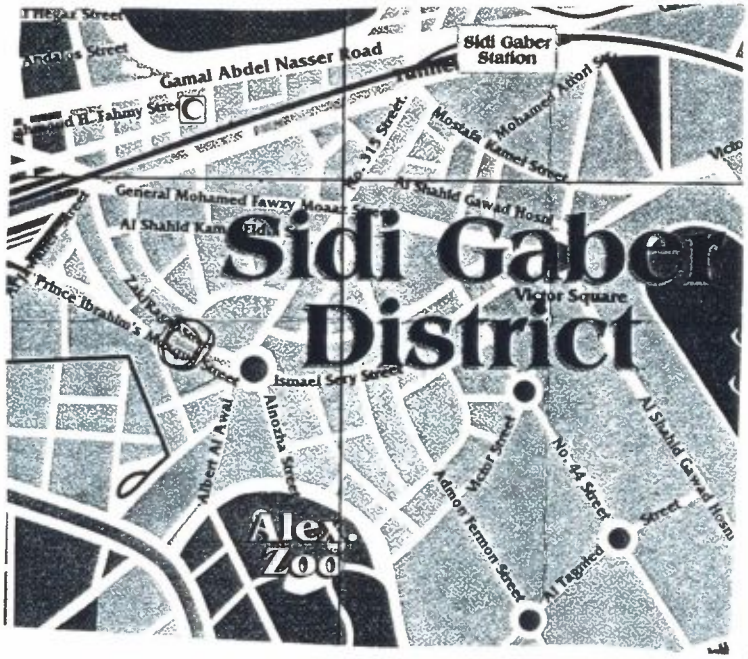
**Infrastructure: Power:** 220 V available in the laboratory and at the roof.
**Telephone lines**: No telephone lines available. .
**Sampler/monitor locations**: On bench in the laboratory/office room.
**Air intake**: $SO_2$ and BS 6 m above the street level, above a fairly open street. TSP on the roof on open space.

**Personnel**: The person responsible is Mr Nasri Sikri (Chemist , B.Sc.).

**Future monitoring station**: The site can be used as a central Alexandria monitoring site. The roof of the room has to be repaired, and the room needs an Air condition.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: Samoha, Alexandria**
**Co-ordinates:. UTM: 779 779, 3456 249 (map 35R)**




← Air intake

EIMP Air Quality Monitoring, Ramler,Nasser Road, street canyon, Alex.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: Ramler, Abdel Nasser Road (Ramler police station), Alexandria**
**Co-ordinates:. UTM: (map 35R)**

**Access/ availability**: Easy to access on Abdel Nasser road.

**Buildings and rooms available**:.No rooms have been investigates, no measurements at present.

**Area description**: Street canyon, (the busiest street in Alex??)

**Local sources:** Traffic.

**Representativity:** Representative highly trafficated street canyon.

**Parameters measured:** None at the moment. Future: NOx, CO, $PM_{10}$ ++

**Data quality: --**

**Measurement equipment:** For future only monitors here.

**Infrastructure: Power:** 220 V available in the laboratory and at the roof.
**Telephone lines**: No telephone lines available?? .
**Sampler/monitor locations**: ?
. **Air intake**: About 3 m above street..

**Personnel**: to be decided

---

**Future monitoring station**: The site will be suitable as one of the more polluted street canyons in Alexandria. Agreements and contracts will be prepared by Dr. Mohammed Nasr. The station will be inspected again in March 1997.

EIMP Air Quality Monitoring, Ramler,Nasser Road, street canyon, Alex.

# Air quality monitoring network
## Site visit report, Alexandria

**Site Name: Ramler, Abdel Nasser Road (Ramler police station), Alexandria**
**Co-ordinates:. UTM: (map 35R)**

# Appendix F

# Siting report from Tebbin

# Air quality monitoring network
## Site visit report

**Site** **Name:** Tebbin
**Coordinates**: N: E: UTM: 337.20, 3295.26

**Access/ availability**: Good parking space at the Tebbin Institute. Indoor stairs to the roof.

**Buildings and rooms available**: Former toilet house on the roof. Not in use.

**Area description**: Heavy industrialized area. Cement factories, steel and iron industry, lead smelters.

**Representativity:** Industrialized area.

**Parameters measured:** TSP every week at different sites. Dustfall at 39 stations analysing total dust, Ph, Ni, Cd, Ca, V and Cr (soluble and insoluble). NO, $NO_2$, $NO_x$, CO, $SO_2$ and $O_3$ measured occasionally around and inside factories.

**Measurement equipment:** TSP high volume (Andersen type) sampler HV (HandiVol 2000X) from Graesby / General Metal Works Inc. 10 years old Monitor lab monitors including a calibrator. Data sampling on strip chart recorder. The laboratory was nice and clean.

**Infrastructure:** **Power:** 220 V available.
**Telephone lines**: No telephone lines are available.
**Sampler/monitor locations**: Occasionally at industries.
**Air intake**:

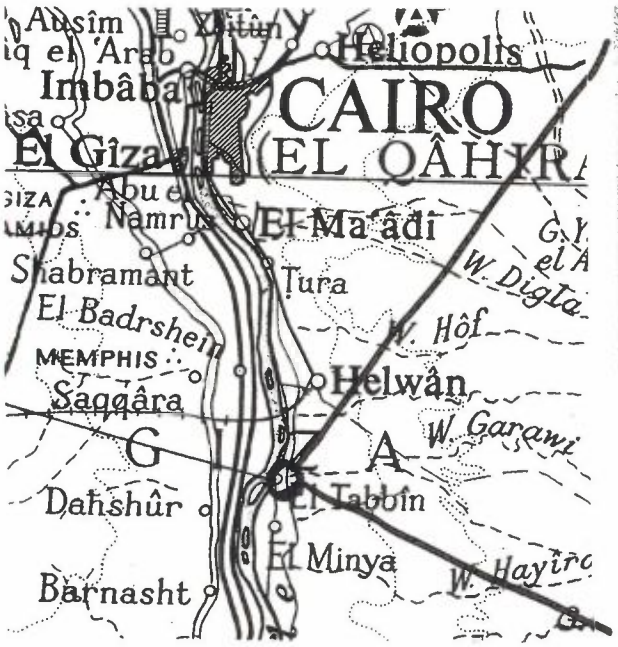
**Personnel**: Responsible for monitors was Mr. El Sayed Mohamed.

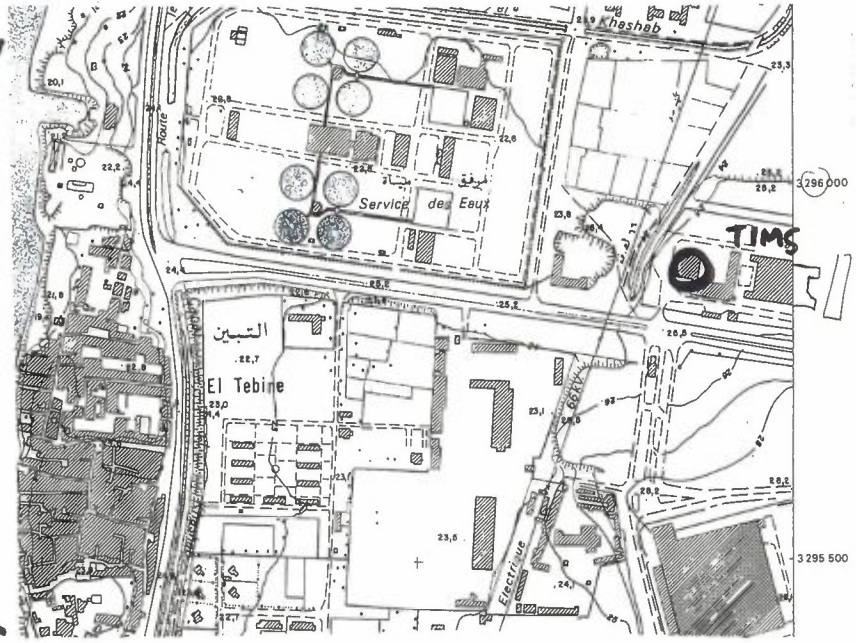
**Future monitoring station:** There was a former toilet house made of concrete on the flat roof. The entrance to the house is from the roof. The house includes three rooms of which two have small windows. There was a table made of bricks in the room inside the entrance. The house is suitable for housing a station.

The rooms must ble cleaned. The water-closets must be removed and the holes in the floor must be closed. The windows must be shut and a door with lock must be installed. A new table (not concrete) 80 cm deep must be built along the whole wall on top of the existing table. An air condition must be installed in the first room through the left wall but not above the table. Openings between the walls and the roof must be closed. Electrical lighting must be installed in all three rooms. The meteorology mast must be placed on the roof. It can be connected directly to the data logger in the shelter by electrical cables. Electrical power must be supplied to the room (minimum two 16 Ampere supply lines each with its own separate switch breakers).

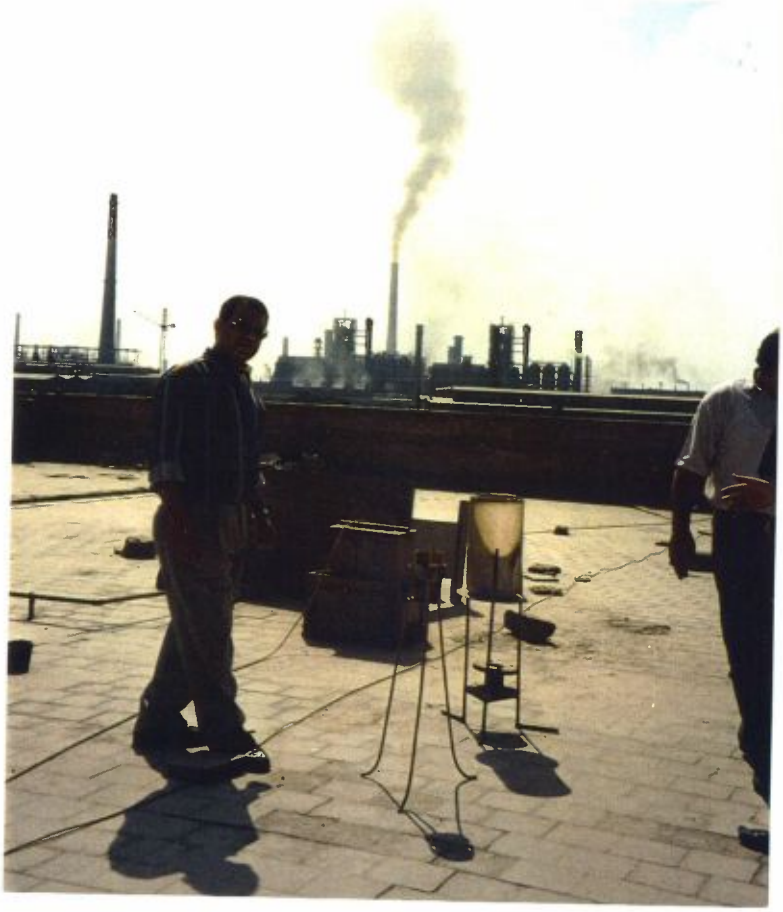
# Air quality monitoring network
## Site visit report

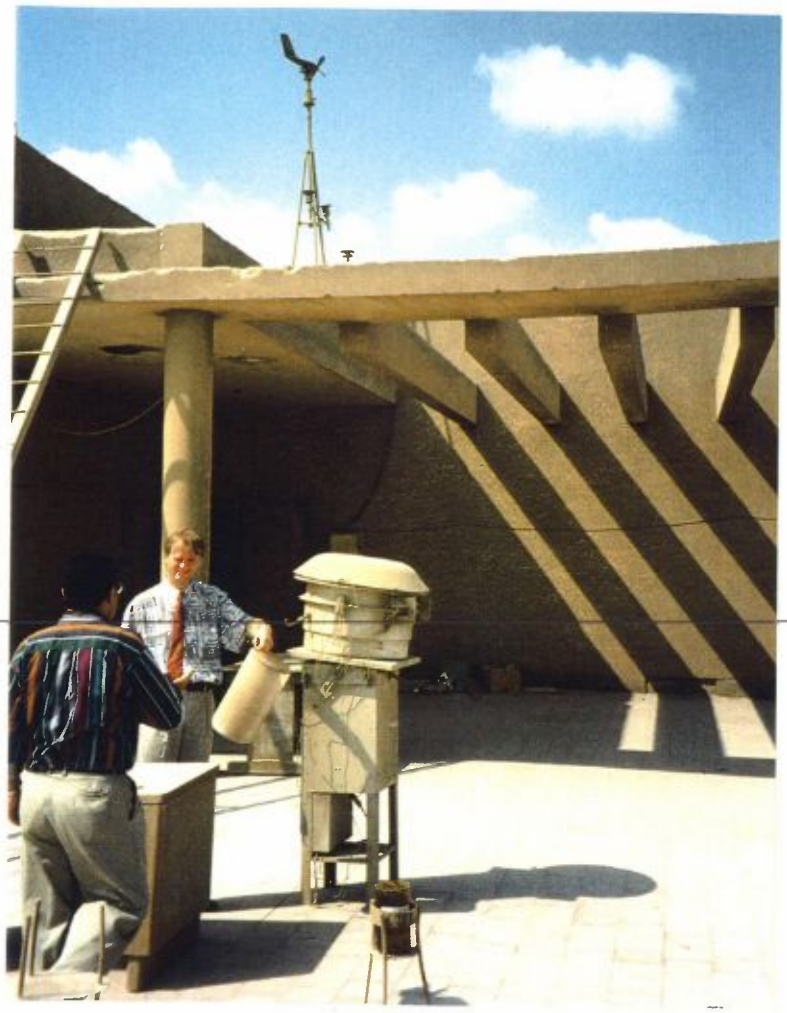
**Site** **Name:** Tebbin
**Coordinates**: N: E: UTM: 337.20, 3295.26




The monitor lab.





On the roof

Possible shelter

# Appendix G

# Meeting with Dr. El-Zarka

**Various notes:**

a) Agenda
b) Organization draft Mon. Lab. and job description
c) Data management
d) Mapping of Cairo, UTM on Gis

EIMP

**Environmental Information and Monitoring Programme**
**3 Abdil Aziz Selim street**
**Mohandessin, Cairo, Egypt**
**Tel/Fax: +20 2 361 5085**

# Note

**To:** **Jan Hassing**
**Copy:**
**From:** **Bjarne Sivertsen**
**Date:** **12 October 1996**

## Agenda for meeting with Dr. El-Zarka

The following topics concerning the EIMP air quality monitoring programme should be discussed with Dr. El-Zarka on 10:00 hrs 14 October 1996:

1. Brief status on monitoring site locations,
2. Organizational chart and job descriptions for the EEAA counterpart and for the Monitoring laboratory staff (see note, Appendix C),
3. Tasks and duties specified for the EEAA task manager counterpart, included some building and construction work to be undertaken at some of the monitoring sites (see note to Dr. Mohammed Nasr)
4. Data management and data flow (Work plan, Task D ) (see note)
5. Mapping of Cairo, specific task to be undertaken by Mrs Hoda Hanaffi's GIS expert Mr. Omar Hussein ( see note),
6. Working group for the EIMP/EEAA Air quality monitoring programme; objectives, members, tasks and duties, call for first meeting (see notes Appendix H),
7. The formal agreement between EEAA and the Ministry of Health Monitoring Laboratory in Embaba , what is the status?
8. Agreement between Atomic Energy Authority and EEAA. What is the status? EEAA need some support from Atomic Energy concerning two measurement stations in Cairo and co-operation in use of monitoring sites. There will have to be an open exchange of air quality data (see Appendix I).
9. All air quality data collected in the EIMP/EEAA programme must be open information. This is the main basis for a good co-operation. The data will also in the future be public data, published daily in the media?

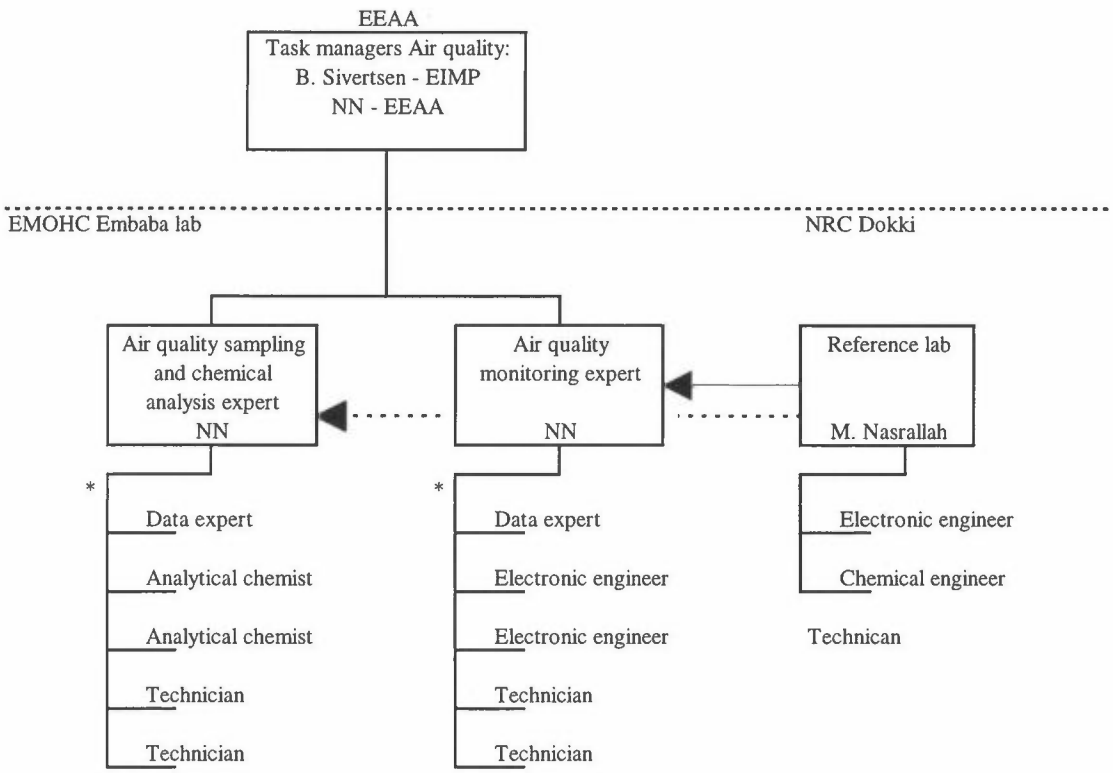
EIMP

# EIMP Air Quality Monitoring Programme

## Organization Chart and Job Descriptions

A draft organizational chart has been developed for the EIMP Air Quality Monitoring Programme. The link between EEAA and the monitor laboratory is represented by the EEAA task manager who will be the counterpart for the EIMP task manager on air pollution monitoring. His responsibilities are described below and in an earlier job description document for this person.

Air Quality Management Organization Plan




* Personell will be assigned to specific sites/ instruments

NN To be appointed

The positions to be filled at the monitor laboratory (at EMOHC in Embaba lab.) require a staff of experts with responsibilities, duties, and qualifications as described in the following.

**Position**:

**Task Manager** Air Quality Monitoring EEAA/ Monitoring laboratory.

**Responsibilities and duties**

- Undertake the EEAA obligations and duties as the counterpart for the EIMP air quality monitoring task manager.
- Manage, plan and be responsible for all air quality data collected from the monitoring programme and from the sampling programme.
- Main responsible for QC/QA at monitoring institutions.
- Participate in the planning and establishment of the air quality monitoring system for Egypt.
- Update and maintain the quality of the monitoring system and be responsible for adequate operation and good quality of the collected data.
- Be responsible for contacts to EEAA, and report the results to EEAA and to other organisations,
- Assign duties to appropriate members of the staff and ensure that necessary equipment, spare parts and facilities are available.

**Qualifications**:

University degree (PhD) with at least 5 years of experience in scientific oriented work or a Civil Engineer/ MSc with at least ten years experience. Preferably the person should also have experience in management and some background related to environmental issues. Must be english speaking.

**Position**:

**Air Quality sampling and chemical analyses manager**

**Responsibilities and duties**

- Manage, plan and be responsible for the air quality sampling programme included preparation of samples and analyses.
- Participate in the planning and establishment of the air quality monitoring system for Egypt.
- Update and maintain the quality of the sampling programme and be responsible for adequate operation and good quality of the collected data.
- Assign duties to appropriate members of the staff and ensure that necessary equipment, spare parts and facilities are available.
- Responsible for QA/QC activities.
- Be responsible for analytical equipment in the lab.
- Assure that manual obtained data from the sampling programme are properly entered into the data base for further application.

**Qualifications**:

University degree or a Civil Engineer with at least five to ten years experience. The person should be an experienced chemist with preferably background in air quality sampling and analyses. He must be trained in using advanced analytical equipment ( ion chromatographs or AA spectrometres) and should have some background in computer technology. He/she must understand english.

**Position**:

**Air Quality monitor programme manager**

**Responsibilities and duties**

- Manage, plan and be responsible for the air quality monitoring programme including calibration and data retrieval.
- Participate in the planning and establishment of the air quality monitoring system for Egypt.
- Update and maintain the quality of the monitoring system and be responsible for adequate operation and good quality of the collected data.
- Assign duties to appropriate members of the staff and ensure that necessary equipment, spare parts and facilities are available.
- Responsible for QC/QA activities
- Responsible for monitoring equipment in the laboratory.

- Assure that good quality data from the automatic monitoring programme are properly entered into the data base for further applications.

**Qualifications**:

University degree or a Civil Engineer with at least five to ten years experience. The person should have some computer background and preferably experience in electronics or automatic instrumentation. He/she must uderstand english.

**Position**:

**Senior engineer, data responsible (two computer experts)**

**Responsibilities and duties**

Responsible for the daily data retrieval, data quality control and data transfer to the final data base. The persons will be responsible for following up daily routines on transferring sampling data into the data base and reporting errors and mistakes, check data, prepare print outs, introduce calibration factors and correct data.

One of the xperts will be responsible for a small PC computer network at the monitoring lab. One expert will be responsible for manually sampled data the other automatic monitored data.

**Qualifications**:

University degree or engineer with computer experience. One of the two must have some experience in PC network applications.

**Position**:

**Analytical chemists (2-3-persons)**

**Responsibilities and duties**

Prepare samples, undertake analyses and calibrate instruments, correct data, prepare various filters and evaluate results of analyses. Responsible for the daily routines in the laboratory, reporting all errors and mistakes.

**Qualifications**:

Chemical engineers or MSc with experience in analytical chemistry. Should have background in work at a "clean" laboratory and used to handle low concentration environmental samples.

**Position**:

**Computer engineer , electronic engineer (2 instrument experts)**

**Responsibilities and duties**

Responsible for the monitors at the sites and for daily data retrieval. They will be assigned to a defined set of monitors and monitoring sites. The persons will be responsible for following up daily routines and weekly calibrations at the monitoring sites. They will have to report all errors and mistakes, check instruments, maintain and undertake minor repairs.

**Qualifications**:

Engineer or BSc with computer experience and some experience in use of automatic instruments. They should both understand some english.

**Position**:

**Technicians/engineers ( at least 4 persons)**

**Responsibilities and duties**

Responsible for daily data retrieval at different sampling and monitoring sites. They will be trained in calibration and sample collection from the various samplers and monitors at specific assigned sites. The persons will be responsible for following up daily routines and weekly calibrations at the monitoring sites. They will have to report all errors and mistakes, check instruments, maintain and undertake minor repairs.

**Qualifications**:

Engineers with electronic, technical and/or chemical background. He/she should have some technical or instrument background, and have insight or interest in automatic instrumentation.

The technicians will undergo a training programme through on-the-job training and should understand some English.

EIMP

**Note**

**Subject** Job Descriptions for EIMP Counterparts in EEAA

Air Pollution Monitoring Programme

**Date** 18 Jun 1996

**To** Dr. M. El Zarka

**Copy**

**From** Jan Hassing

**Environmental Information and Monitoring Programme**

**EEAA - Danida - COWI**

**3, Abdel Aziz Street**
**Mohandessin, Cairo, Egypt**

**Tel.: +202 361 5085**
**Fax: +202 361 5085**

**E-mail: eimp@intouch.com**

# 1 Air Pollution Monitoring Counterpart

**Position title:** Air Pollution Monitoring Specialist

**Rank of position:** Senior specialist reporting to head of Department of Environmental Quality

**Responsibilities:**

You will be responsible for managing the day-to-day operation of EEAA's responsibilities for establishing and operating an air polltion monitoring system for Egypt. You will bridge periods when the Air pollution monitoring programme task manager is not in Egypt. The EEAA use and distribution of air quality information, analyses of data and description of cause relationships will represent an important part of the future tasks.

The analysis of air quality data from the network collected and quality controlled by other laboratories under contract to EEAA will be your responsibility. The received data is to be compiled in an integrated database system within EEAA, and summarised in periodic reports on the state of the Egyptian environment.

**Duties**

Planning and coordination of EEAA's air pollution monitoring programme. The duties include coordination with other institutions, ministries and internationally-sponsored projects.

Preparation of technical Terms of Reference for contracts with the air quality monitoring laboratory and co-operating institutes. These Terms will describe in detail the work to be done, methods to be used, and quality control procedures to be followed by the contractors.

Supervision of the performance of contractors, including review of progress reports, acceptance of data and other results. Participate in the procurement prosess.

EIMP

## Technical note

# Ref: Work programme item D: Data Management

### D.1.1. Data collection, sampling time and frequencies

The instruments used in the air quality monitoring part of the EIMP project can be divided into two categories according to the method of sample collection, see table D1.

*Table D1: 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 (electronical) sample collection. | Monitors measuring $SO_2$, NO, $NO_2$, $NO_x$, $O_3$, CO, NMHC, $PM_{10}$ and meteorological parameters. |

Manual sample collection is operated by a technician who visits the site at regular times to collect the samples. The samples are brought the laboratory for analysis

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 discette 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 D2.

*Table D2: A list of averaging times, sample, site visits and maintenance frequencies for the different instruments.*

| Instrument | Averaging time | Sample frequency | Site visit frequency | Maintenance frequency |
|---|---|---|---|---|
| Hi vol TSP | 24 h | Ev. 6th day | Weekly | Ev. 3 months |
| $PM_{10}$ sampler | 24 h | Weekly | Weekly | Ev. 3 months |
| Sequential sampler $SO_2$ | 24 h | Weekly | Weekly | Yearly |
| Sequential sampler $NO_2$ | 24 h | Weekly | Weekly | Yearly |
| Sequential sampler BS | 24 h | Weekly | Weekly | Yearly |
| Dust fall collector | 1 month | Monthly | Monthly | Yearly |
| Monitor $SO_2$ | 1 h | Dayly/weekly | Weekly | Ev. 3 months |
| Monitor NO, $NO_2$, $NO_x$ | 1 h | Dayly/weekly | Weekly | Ev. 3 months |
| Monitor $O_3$ | 1 h | Dayly/weekly | Weekly | Ev. 3 months |
| Monitor CO | 1 h | Dayly/weekly | Weekly | Ev. 3 months |
| Monitor NMHC | 1 h | Dayly/weekly | Weekly | Ev. 3 months |
| Monitor $PM_{10}$ | 1 h | Dayly/weekly | Min. weekly | Ev. 3 months |
| Meteorology sensors | 1 h | Dayly/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.

### D.1.2. Data retrieval at monitoring lab

Samples from manual and semi automatic samplers are normally brought to the Monitoring lab for chemical analysis and scaling to scientific units. Some local laboratories will perform the anlysis themselves and report the results to the Monitoring lab. After data quality control the results are entered manually into the monitoring database. The data base structure will have to be decided after specifications by the instrument supplier and will depend upon the data retrieval and data storage possibilities in the total monitoring system.

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

### D.1.3. Data quality check and control procedures

Data quality check and control includes both instrument maintenance and data quality assurance and validation. Each instrument in the ambient air monitoring network is supervised by dedicated personnel at the Monitoring lab. although some of the instruments can be operated by local site technicians. Since the personnel at the Monitoring lab must specialize themselves in a limited number

of instruments the Monitoring lab. can have one or more persons involved at one specific site.

Figure D1 shows the flow sheet for the quality check and control procedures.

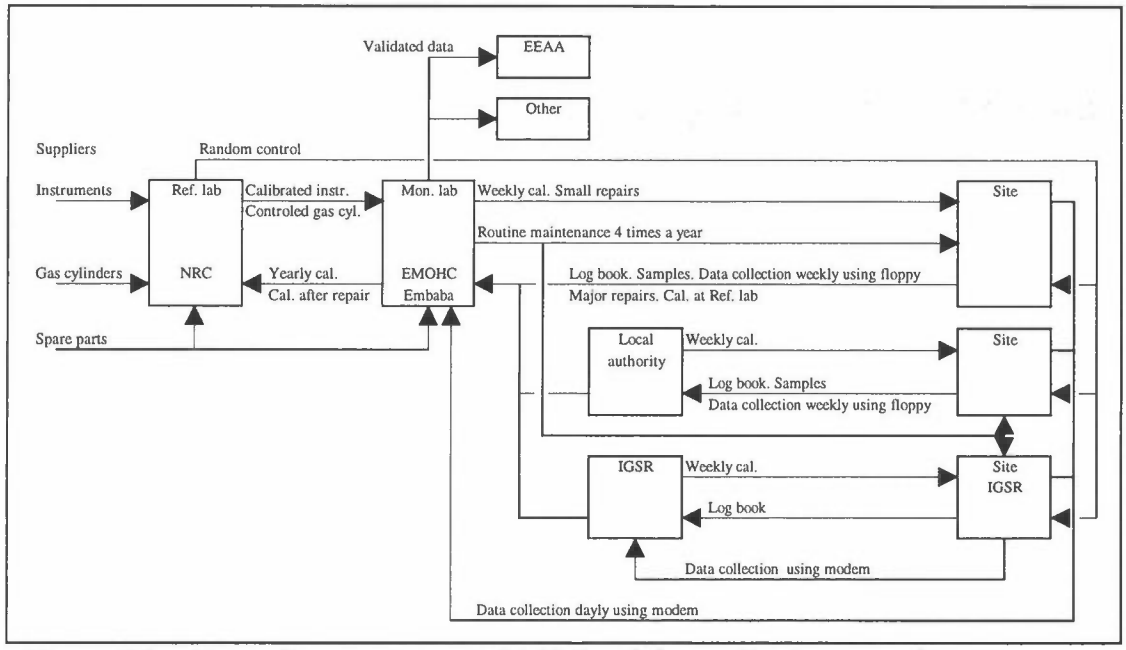



*Figure D1: Air quality management QA/QC and data collection procedures*

**Instrument maintenance**

Instrument maintenance includes:

1. Calibration of new instruments and control of new gas cylinders at the Reference lab.
2. Two point calibration of ambient air quality monitors once a week at the site.
3. Periodical maintenance and control of the instruments at the site.
4. Random control and calibration at the site by the Reference lab.
5. Yearly calibration and control of the instruments at the Reference lab.
6. Documentation of all maintenance in site log journal.

The **Reference lab.** is responsible for maintaining the highest level of calibration standards. Before a new instrument is put into operation it is calibrated at the Reference lab. Before a new gas cylinder is taken to the measurement site it is checked at the Reference lab.

The Reference lab. will also undertake random site visits to control the operations and calibrations at the sites.

Once a year the instruments are recalibrated at the Reference lab. Since the calibration is undertaken at the Reference lab. the measurement site will be

without instruments for a certain period each year, typically two weeks. It will probably be difficult to maintain a calibration schedule in the beginning of the project due to lack of experience among the technicians and the large number of instruments involved.

The **Monitoring lab.** 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 Monitoring lab. is also responsible for repairing instruments at the site or bringing an instrument to the Monitoring lab. for major repairs. In the latter case the Monitoring lab. will bring the instrument to the Reference lab. for recalibration before installing it in the field again.

In some cases it will be necessary to use local trained personnel for weekly maintenance at the sites. This includes filter changes, two point calibrations and colletion of monitor data on discette if a telephone line is not available.The local personnel reports to the Monitoring lab. if any instrumental problems occur.

**Data evaluation at Monitoring lab.**

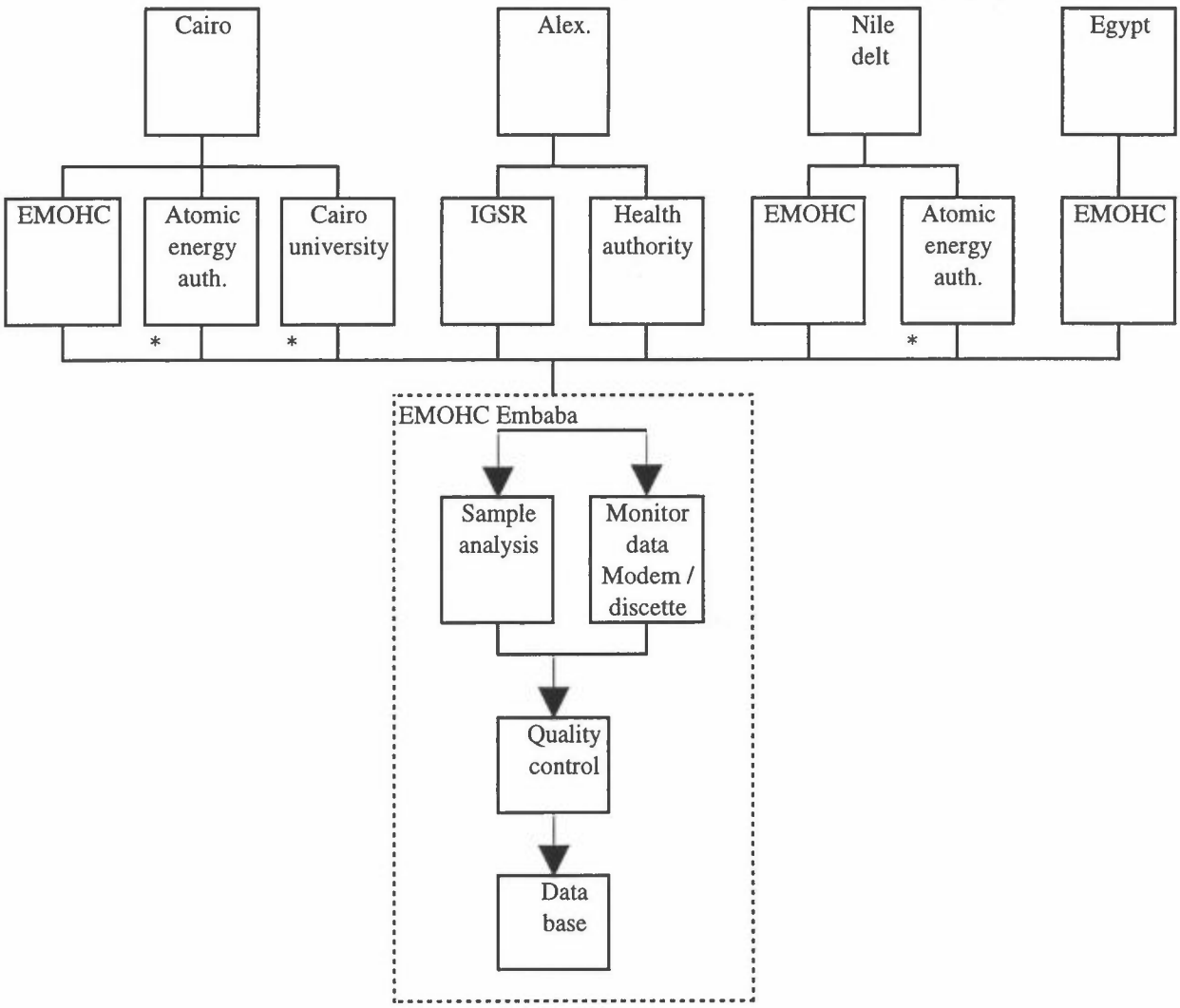
A basic evaluation of the data will be performed by the Monitor lab. during data retrieval and primary data checks. This part of the data evaluation includes:

1. Inspection of retrieved data to see if the instrument is in good order.
2. Inspection of results from two point calibrations (monitors).
3. Inspection of all site log journals from site visits.
4. Removal of invalid data.
5. Documentation of evaluations.

Data evaluation is performed mainly at the Monitoring lab. But if a local laboratory undertake chemical analyses of samples they will have to perform some data control before the results are transferred to the Monitoring lab.

Data evaluation includes removal of data which is obviously invalid such as data from weekly calibrations, instrument malfunctions, power failures e.t.c. It also includes inspection of data to see if they are reasonable 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 input to the data evaluation.

Air Quality Management Data Flow Sheet



**Environmental Information and Monitoring Programme**
**3 Abdil Aziz Selim street**
**Mohandessin, Cairo, Egypt**
**Tel/Fax: +20 2 361 5085**

# Note

**To:** **Dr. Mohamed El-Zarka**
**Copy:** **Mrs Hoda Hanaffi, Jan Hassing, Omar Hussein Sayed**
**From:** **Bjarne Sivertsen**
**Date:** **10 October 1996**

## Air Quality Monitoring Programme, Mapping of Cairo , UTM on GIS

An important part of the air quality monitoring site identification study will be to specify the geographical locations with reference to a UTM reference system. This system can be used for specifying monitoring sites , sources and air quality data. At present we need a simplified map of Cairo and Alexandria with UTM reference lines.

The task has previously been discussed with Mr Omar Hussein Sayed who is capable, willing and interested in undertaken this task.

The following tasks have to be undertaken:

- Digitalise the Cairo map, from Shoubra el Kheima to Tebbin (about 20×40 km),
- Include the most significant landmarks, rivers, waters, main roads and villages/cities,
- Include the UTM reference lines as given on the scale 1:25 000 map of Maadi,
- Make print-outs in A-4 format.

The task should be undertaken before 20 November 1996 and presented to D Clark/B Sivertsen at the EIMP office.

***EIMP Air quality monitoring/ 10 October 1996***

# Appendix H

# Air Quality Monitoring Programme Working Group

a) Working Group meeting
b) Working Group TOR
c) EIMP Steering Committe
d) EIMP Committee Structure

# Fax

EIMP

**Environmental Information**
**and Monitoring Programme**
**3 Abdil Aziz Selim street**
**Mohandessin, Cairo, Egypt**
**Tel/Fax: +20 2 361 5085**

**To: EIMP Working group members** **Fax no:_____**

**Att:_____** **Date: 15 October 1996**
**No pages: 3**

## *EIMP Air Quality Monitoring Programme, Working group meeting*

You have been proposed as a member of the EIMP Air Quality Monitoring Programme Working Group. Concerning the group's mandate, objectives , tasks and responsibilities, please see attached terms of reference.

The working group will be called for its first meeting on:

**Thursday 21 November 1996 at 10:00 hrs,**
**in the EIMP offices in Mohandessin.**

A preliminary agenda contains:

1. Introduction of members,
2. Status of the Air Quality Monitoring Programme,
3. Monitoring laboratory and sub contracting institutions,
4. Discussions on site selections and air quality indicators,
5. Schedule of next meetings,
6. Any other business.

We look forward to fruitful discussions and a good future co-operation.

Yours sincerely

Bjarne Sivertsen
(EIMP Air pollution Monitoring)

EIMP

# Terms of reference
# EIMP Air Quality Monitoring Working Group

## 1. Objectives

The main objectives of the working group will be to discuss, guide and follow up the work programme undertaken by the EIMP Air Quality Monitoring Programme.

The working group will advice the EIMP steering committee on design of the air monitoring programme, sampling sites, QC/QA, training and reporting. It will also undertake an annual evaluation of the programme and discuss indicators and parameters.
Further it will act as a forum for exchange of information concerning air pollution monitoring and reporting within the EIMP programme and in Egypt in general.

## 1. Members

The members elected for the working group will be representing institutions and bodies directly or indirectly involved in the Air Quality Monitoring Programme, or defined as users of data and results emerging from the monitoring programme.

As regular members of the working group the following have been proposed:

- EEAA responsible for Air Quality: Dr. Abdil Latif Hafez
- NRC responsible for the Reference Laboratory: Professor Mahmod Nasrallah
- IGSR the University of Alexandria: Professor M El-Raey (Air quality measurements, Institute of Graduate Studies and Res., IGRS)
- Atomic Energy Authority: Dr. Mokhtar Hamza, responsible for the radiation monitoring network
- EEAA, JICA Minilab system: Dr. Mawaheb Abov el Azm
- EEAA Air Quality Monitoring responsible: (Dr. Mohammed Nassar)?
- EIMP team leader: Mr. Jan Hassing

Ad hoc members and observers:

- EMOHC, Air Quality sampling responsible/ monitoring responsible expert.

## 3. Tasks and responsibilities

The working group should be involved in the selection of monitoring sites in Egypt. This work is going on at present, and the Air Quality Monitoring Programme team leader will present the site selection reports, discussions and reasoning for the selection of sites, and obtain some feedback from the working group.

The work programme and the available personnel and experts for undertaking the monitoring of air quality in Egypt will have to be discussed as soon as possible. Also possible training seminars and on the job training programmes have to be presented and discussed in the working group.

Further tasks by the working group will be defined by the project as it proceeds and by the working group itself. Typical major items should be:

- action plans,
- status and project reports,
- training programmes,
- status and performance of monitoring institutions,
- contracts and permits for site allocations,
- equipment performance, calibrations and QC/QA,
- air quality data reporting,
- data availability and openness,
- environmental status.

It should further be clarified at this stage of the project the role of audits and the results of calibration and proficiency tests in the relations between EEAA and the monitoring institutions. As part of this process, the distribution of reports from calibrations, controls and audits must be decided upon. This must be included in the foundation for the contract with the Reference Laboratory as well as with the monitoring institutions.

The working group should in the future also be involved in the discussions of the use of data and results coming out of the national air quality monitoring programme.

## 4. Working modality

Depending upon the tasks and work load defined for the working group, it will be necessary that the group meets at least 2 times a year. The meetings will also be dependent upon the participation of the EEAA team leader, who's functions are covered by only about two visits to Egypt each year.

Some of the work group meeting should also be initiated by the monitoring laboratory responsible scientist, as soon as this organisation is well defined and manned with proper experts.

## 5. Job description for working group chair person

The chair person of the working group should be experienced in air pollution work. The chair person should further hold a PhD degree and have worked with practical tasks related to air quality monitoring, air quality legislation and air quality planning included impact assessment. He/she should also have some knowledge in statistical and numerical modelling.

*Draft/ BS/ 10 Oct. 1996*

## TERMS OF REFERENCE

## EIMP STEERING COMMITTEE

### 1 OBJECTIVE

The EIMP Steering Committe is created in order to ensure that EEAA top level management and Danida, as partners in environmental development are making major decisions regarding the implementation of the EIMP. Further, the committee will act as a forum for exchange of information on the EIMP between the committee members and the observers.

### 2 MEMBERS

The regular members of the committee are:

| | |
|---|---|
| EEAA Representative: | CEO, Dr Salah Hafez (Chairman) |
| EEAA Representative: | Dr Mohamed ElZarka |
| EEAA Representative | Ms Dr Hoda Hanafi |
| Danida | Ms Kirsten Rasmussen |
| EIMP Team Leader | Mr Jan Hassing (Secretary) |

Ad hoc committee member:

| | |
|---|---|
| COWI Management Representative: | Mr Mogens Heering |

Observers are:

| | |
|---|---|
| OSP Project Manager | Mr Morten Palle Hansen |
| EIS Project Manager | To be named |

Ad hoc observers (among these Mr David Kerrigan, EETP) can be called in according to the agenda items to be discussed.

### 3 TASKS AND RESPONSIBILITIES

The Steering Committee's work in relation to the EIMP comprise approval of the following major items:

- annual plans of action and budgets
- all major project reports
- any major fund reallocation
- changes in the EIMP organization
- training plans
- request for additional funds
- deviations from the project document
- selection of monitoring institutions
- contracts with monitoring institutions
- performance of monitoring institutions
- major equipment supply contracts

Through the approvals of these central items, the Steering Committee can guide the general direction of the EIMP work and will through the discussions be verbally updated on the progress.

## 4 WORKING MODALITY

### 4.1 Meeting frequency

The EIMP Steering Committee will meet min. 4 times a year. The meetings will be called 2 weeks in advance and the agenda and background documents will be distributed latest 1 week before the meeting. The Chairman can at any time call a committee meeting. A member can ask the Chairman in writing to call for an unscheduled meeting. The request shall be accompanied by a proposed agenda and the required background documents. The request can only be turned down if all other regular members unanimously decide so.

### 4.2 Minutes of Meeting

The Secretary shall prepare Minutes of Meeting to be distributed latest 2 weeks after the meeting. If no comments have been received by the secretary 2 weeks after the distribution, the Minutes of Meeting is approved.

### 4.3 Decision making process

Decisions are made unanimously between the regular and ad hoc members of the committee.

### 4.4 Standard agenda

The agenda will as a minimum comprise the following items:

- EIMP Team Leader's progress report (covering the period since last meeting)
- Items for discussion and subsequent approval
- Scheduling of next meeting
- Any other business

Draft/JMH/23 June 1996

**REVISED EIMP COMMITTEE STRUCTURE**

Summary of revised EIMP committes and working groups, their functions and composition.

| Organizational unit | Functions | Membership | Frequency of meeting |
|---|---|---|---|
| Egyptian Environmental Monitoring Committee EEMC | Develop and discuss:<br>• monitoring policies<br>• strategic approaches to achievement of the monitoring policies<br>• prioritization and selection of new monitoring activities and programmes<br>• ownership, access to and transfer of data<br>• implementation guidelines for monitoring programmes | • EEAA (chair,1)<br>• EEAA (1-2)<br>• Monitoring Institutions (5)<br>• Reference Lab (1)<br>• Team Leader EIMP (1)<br>• Team Leader EIS (1)<br>• Programme Coordinator, Regional Labs (1)<br>• Donors (incl. Danida) | 1/year |
| Environmental Information and Monitoring (EIMP) Steering Committee | Approve:<br>• annual plans of action and budgets for the project<br>• all major project reports<br>• any major fund reallocation<br>• changes in the organization<br>• training plans<br>• requests for additional funds<br>• deviations from the project document<br>• selection of monitoring institutions<br>• contracts with monitoring institutions<br>• performance of monitoring institutions | • EEAA (chair,1)<br>• EEAA (1-2)<br>• Danida (1)<br>• Team Leader EIMP (1)<br>• CIDA PM as observer (1)<br>• OSP as observer (1)<br>• ad hoc observers (i.a. EETP) | min. 4/year, otherwise as required |
| Working Groups<br>RefLab (water) | Discuss and advise Steering Committee/EIMP on:<br>• choice of analytical methods<br>• QA/QC procedures and training<br>• sampling procedures<br>• design of proficiency tests<br>• evaluation of proficiency results | • RefLab head water (1)<br>• Monitoring Institutions relating to water (3)<br>• QA/QC adviser (1)<br>• EEAA (1) | min. 2/year, otherwise as required |
| RefLab (air) | Discuss and advise Steering Committee/EIMP on:<br>• choice of analytical methods<br>• QA/QC procedures and training<br>• sampling procedures<br>• design of proficiency tests<br>• evaluation of proficiency results | • RefLab head air (1)<br>• Monitoring Institutions relating to air (2)<br>• QA/QC adviser (1)<br>• EEAA | min. 2/year, otherwise as required |

| Organizational unit | Functions | Membership | Frequency of meeting |
|---|---|---|---|
| | | representative (1) | |
| Marine monitoring | Discuss and advise Steering Committee/EIMP on:<br>• design of marine monitoring programme<br>• field sampling<br>• annual evaluation and adjustment of monitoring programmes<br>• selection of environmental indicators for coastal water pollution | • EEAA representative (1)<br>• Monitoring institutions relating to sea water<br>• EIMP Team Leader (1)<br>• Danida marine adviser (1) | |
| Air monitoring | Discuss and advise Steering Committee/EIMP on:<br>• design of air monitoring programme<br>• field sampling<br>• annual evaluation and adjustment of monitoring programmes<br>• selection of environmental indicators for air pollution | • EEAA representative (1)<br>• Monitoring institutions relating to air pollution (2)<br>• EIMP Team Leader (1)<br>• Danida air pollution adviser (1) | min 2/year, otherwise as required |
| Point source database | Discuss and advise Steering Committee/EIMP on:<br>• scope and content of database<br>• design of point source monitoring programmes<br>• evaluation of old data<br>• annual evaluation and adjustment of monitoring programme<br>• decisions on 25-100 sources to be monitored | • EEAA representative (1)<br>• Point source monitoring institutions (3)<br>• other institutions contributing to the database<br>• EIMP Team Leader (1)<br>• Danida advisers (depending on agenda) | min. 2/year, otherwise as required |

# Appendix I

# Previous meeting with Atomic Energy Authority

EIMP

**Minutes of Meeting** Atomic Energy Authority
National Center for Nuclear Safety

**Subject:** Cooperation within air pollution monitoring

**Date:** 10 July 1996

**Place:** AEA, Nasr City

**Participants:** Dr Mokhtar.S.A. Hamza MH
Dr. Aly
Mr Jan Hassing JMH
Dr Douglas Clark DRC

**Prepared by:** Jan Hassing/20 July 1996/Doc89

**Distribution:** AEA (2), EEAA (1), EIMP (1)

**Environmental Information and Monitoring Programme**

**EEAA - Danida - COWI**

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**Tel.: +202 361 5085**
**Fax: +202 361 5085**

**E-mail: eimp@intouch.com**

## 1 Purpose of the meeting

The meeting was held in order to discuss possibilities for cooperation between EIMP/EEAA and AEA.

Bjarne Sivertsen had previously visited on 27 May and 1 June, and a Technical Note was prepared ( see BS Mission 2 Report App.I). Dr. M. El Zarka invited Dr. Hamza to a meeting with JMH on 24 June, but the discussion was postponed pending delivery of Sivertsen's mission report and advice regarding areas of cooperation to be discussed .

## 2 Visit to AEA facilities

The computer centre for the radioactive network was visited. Data from 30 stations all over Egypt are collected via modems and telephone lines. Stations are being called up every 15 min. A mobile multigas station was also visited. It was ready to be tested and put into operation.

## 3 Cooperation possibilities

A discussion was held on the interests of the parties. AEA stated the following reasons for an interest in a cooperation:

- through a cooperation AEA would secure access to environmental data which would greatly enhance their research work (Ph.D. theses etc.)
- AEA saw a possibility for applying the experience drawn from the radioactive network to the benefit of another public authority
- AEA would like to have a commercial agreement on the provision of data and assistance and could in this way finance further research and training activities

second / second

- AEA would like to have further training of staff in state-of-the-art methods and analyses. This could for instance take place through Danida Fellowships if AEA was included in the programme as subcontractor to MOH

- AEA saw no problem in a cooperation with MOH, which they also considered a natural choice for the main air pollution monitoring institution. AEA would be willing to train MOH staff in the operation of a multigas station and locate the presently idle mobile station at MOH

EIMP stated the following points of interest in a cooperation:

- AEA has experience in data transfer via telephone lines in Egypt and has qualified staff that can train MOH staff

- the 30 stations covering the National needs may in some cases double as air pollution monitoring stations

- having a firm monitoring basis in AEA would improve possibilities for capacity building at MOH while at the same time collecting reliable data from some stations

- additional new single - gas air pollution units ( 3 SO2, 3 Nox, 3 CO) were intended for individual locations according to local considerations and sources.

- the air quality station site at the National Museum Park at El Tahrir Square was definitely selected and being prepared .

3 End of the meeting

The parties agreed to meet again and discuss realities when the monitoring plans have reached a more advanced level.

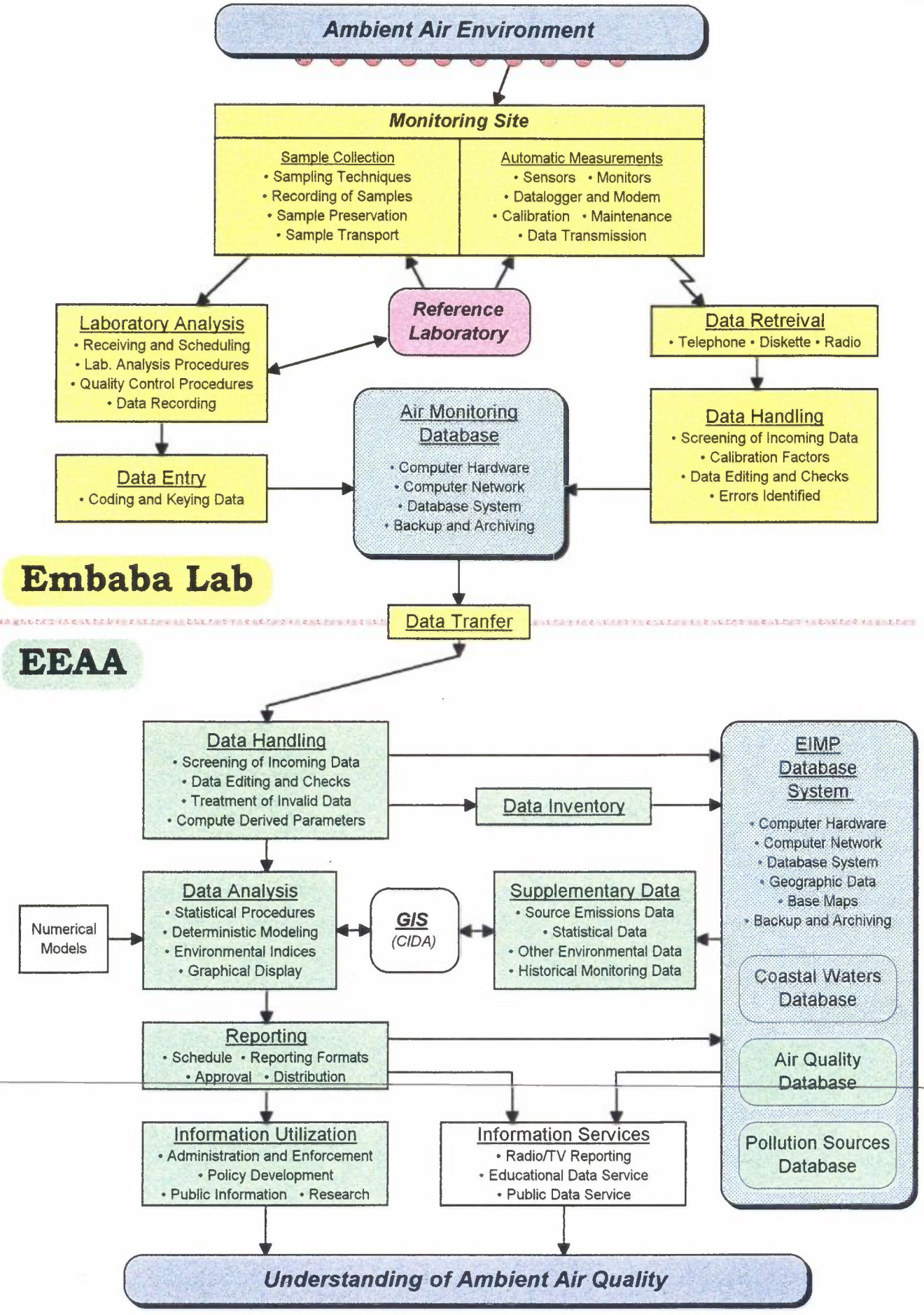
# Appendix J

# Various notes

a) Data flow sheets
b) Meeting with Egyptian Survey Authority (ESA)

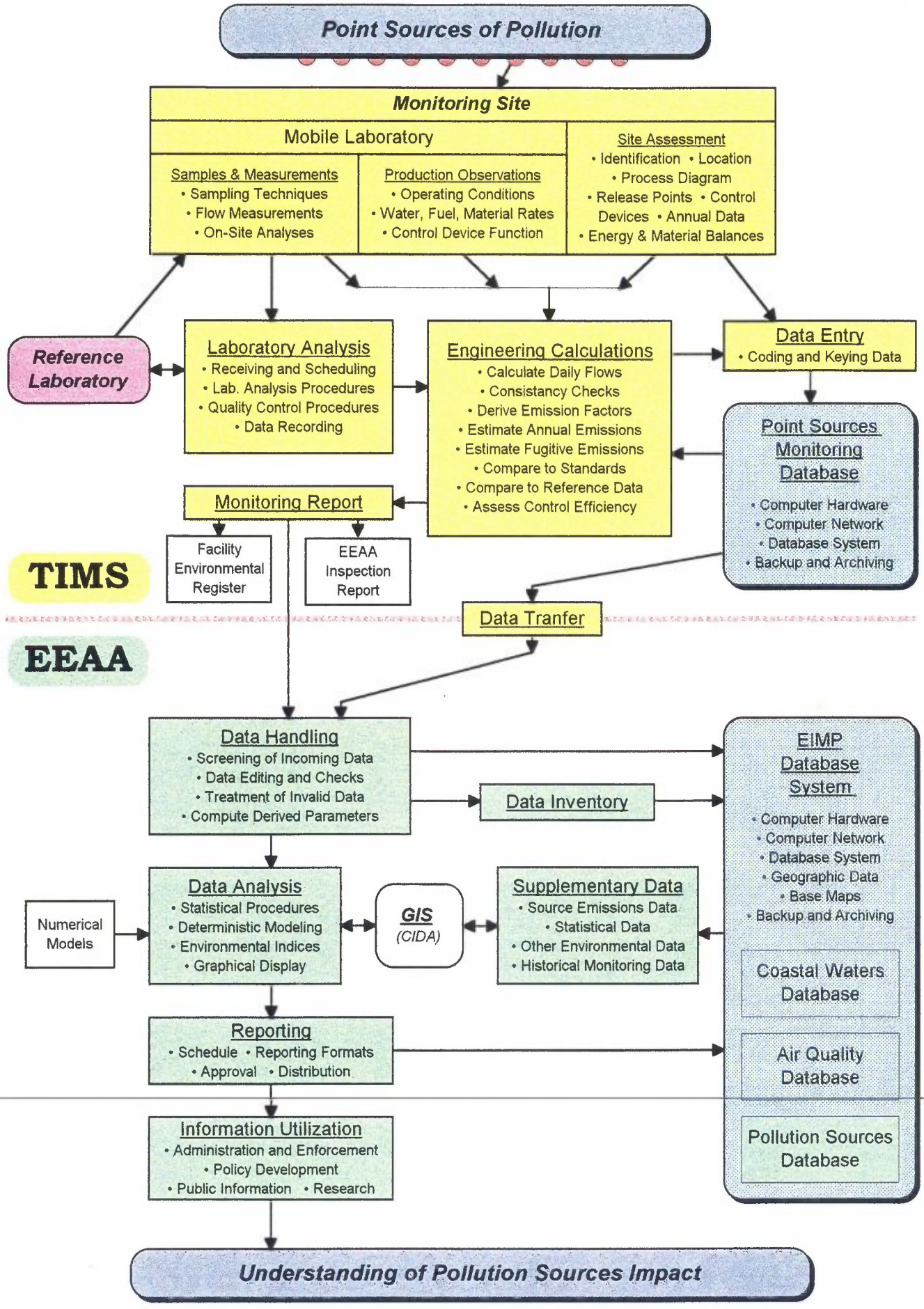
# Air Quality Data Flow





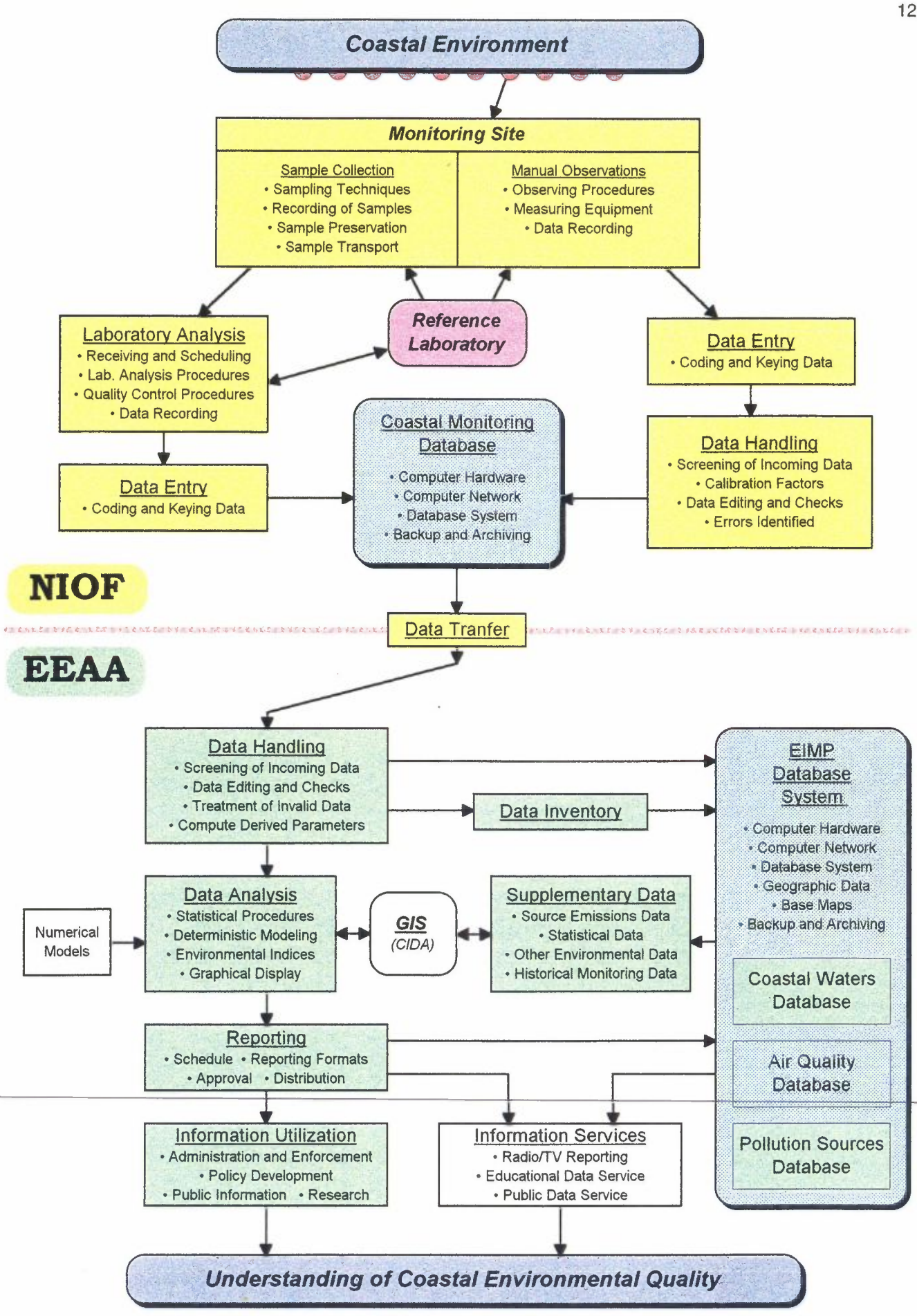
# Pollution Sources Data Flow





# Coastal Waters Data Flow





EIMP

**Minutes of Meeting** Egyptian Survey Authority (ESA)
Topographic Mapping Dept. (Aerial Survey Dept.)

**Subject:** Digital base maps

**Date:** 17 July 1996

**Place:** ESA Aerial Survey Dept, 308 El Haram St.

**Participants:** Mohamed Atef - MA, ESA
DRC

**Prepared by:** DRC/18 Jul 96 (DRC notes pg 159-163)

**Distribution:** JMH, JAA, LGA/TRK, AJE, BS, UL, ARA, file

**Environmental Information and Monitoring Programme**

**EEAA - Danida - COWI**

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**Mohandessin, Cairo, Egypt**

**Tel.: +202 361 5085**
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**E-mail: eimp@idsc.gov.eg**

## 1 Purpose of visit

DRC is investigating sources of geographic data and digital base maps for the pollution sources database, and for other EIMP and EEAA use.

Mohamed Atef (MA) was named by Sherif Awad of Quality Standards (ArcInfo distributor) at meeting at EIMP on 20 June, as a person to contact at ESA regarding digital base maps.

## 2 The Visit

### 2.1 General

MA is head of the ESA aerial survey department, which has the official name "Topographic Mapping Department". ESA has four divisions:

- Administration and Finance, in main ESA headquarters building downtown
- Topographic Mapping, including printing department, at 308 El Haram St.
- Cadastre Sector, located 6 km from headquarters building
- Geodesy Sector, located behind headquarters building

There is also a military survey and mapping authority.

There may be a system for numbering of land parcels. Contact: Engr. (Ms.) Faiza, head of the land registration department, located at the main building, second floor. Tel: 335 6364, 348 8083.

MA knew of the CIDA EIS pilot project, although not the current status. He mentioned Dr. Salah Tahloun, and a workshop on the CIDA GIS. MA also mentioned a visit/workshop on development of a national GIS, by Dr. Mossad Alem, head of GIS in the Canadian Ministry of Natural Resources.

### 2.2 1:50,000 Maps

DRC was given a hand-coloured index map for 1:50,000 maps. There are 3 main areas:

1. Delta east to (but not including) Suez Canal, and Fayum. [These are the maps done with Geonex, with USAID funding.] There are 74 maps, produced from "40000" aerial photos. The index shows which maps are still in preparation. The maps in preparation will be available in a few months.

2. Nile valley and eastern desert to Red Sea. This was the Finnmap series produced with Finnida funding from "80000" aerial photos, from 1988 to May 1996. Essentially all of these maps are now available as printed maps.

3. "Extension area" which is the strip of maps from Cairo east to Suez. This was not originally done for military reasons, but was approved last year.

Printed maps cost about 16.50 LE each, and are available from map sales at the main ESA building. Make a written list of map sheet numbers wanted, in form of a letter.

The original digital map files are not available. To get digital base maps, the printed maps are scanned and then edited. This is done to order. Price up to about 5000 LE per map, depending on what features and layers are wanted. It is important to discuss layers before ordering the digitising, as this effects the price significantly. For example, leaving out the height contours could halve the price. If the sheet has already been digitised, you pay less, otherwise full price for new work. Write a letter to initiate a request for digitising. The price quote has to be formally approved. Prices mentioned now are only approximate.

The 1:50,000 and 1:10,000 maps have both geographic coordinate grid (latitude and longitude) and Cartesian coordinates (ETM), but map sheet corners are latitude-longitude points. Larger scale maps (1:5000, 1:2500, 1:1,000) use ETM coordinates. ETM is "Egyptian Transverse Mercator". ETM is based on the Helmat 1910 Ellipsoid. The military uses UTM, however.

### 2.3 1:10,000 Orthophoto Maps

1:10,000 orthophoto maps show a monochrome (grey-tone) image on white paper, with 1 km grid apparent in the image. It is only the image, without any line features. About size A2. Major ETM and latitude-longitude grid lines are drawn in colour.

Coverage includes all agricultural areas, except military areas (which there are many of) where they do not have any air photos. DRC was given an index of the delta area maps. There is also an index of the Nile valley maps. Each 1:50,000 map has 24 1:10,000 orthophoto maps.

The orthophoto maps are available on order, either as printed map, or as both printed map and raster image. The raster image could be used as a background in a GIS map, but it does not include any digitised lines. The cost is 100 to 150 LE for the hard copy, and about 500 LE with the raster image file.

### 2.4 1:2,500

ESA has taken "10000" aerial photos in four governorates to produce 1:2,500 base maps:

- Behera,
- Sharkaya,
- Assiut,
- Sohag.

The 1:2,500 maps are digital line maps in ETM coordinates. They are produced on order, and can be written in any digital format, such as DXF.

### 2.5 1:5,000 Maps

These can be produced from the 1:2,500 maps, if desired.

### 2.6 1:1,000 Town Maps

All the towns in the four governorates named above have been mapped at 1:1,000.

### 2.7 1:250,000 Maps

1:250,000 are not available yet. These will be produced from the 1:50,000 maps.

### 2.8 Ministry of Irrigation classification of agricultural areas

The "ministry of irrigation" has mapped drains, canals and classified soil salinity using 20000 scale IR photos, with stereoscopic image interpretation. The soil polygons were drawn on the photos, and then scanned and printed onto 1:10,000 orthophoto maps.

### 2.9 Tour of ESA mapping

MA will be happy to arrange a tour of the ESA topographic production area any-time.

# Appendix K

# Presentations at Steering Committee Meeting 15 October 1996

## Steering Committee Meeting No. 2

**Environmental Information and Monitoring programme**

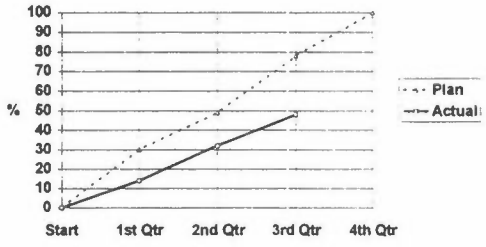
EIMP

## Agenda

- programme progress & corrective action
- cooperating institutions
- contract format
- annual plan of action 1996
- any other business
- next meeting

EIMP

## Progress over 9 months




EIMP

## Deviations from plan

- lack of resources (counterparts), 39% of planned resources were available, however 62% of planned progress was made
- lack of continuity in work due to limitations in expatriate staff time alloction
- lack of support staff
- lack of office facilities (first 3 months)
- inadequate communication facilities
- adviser positions in a capacity building programme requiring rapid executive decisions and extesive work input for timely implementation

EIMP

## Possible corrective actions

- adjustment of plan by transferring some 1996 activities to 1997 (training, QA/QC work, installation of equipment, detailed database development)
- utilize local consultants increasingly for specific non-continuous tasks to speed up progress (funding)
- frequent Steering Committee meetings
- deputy staff for Dr Mohamed ElZarka for daily contacts on routine matters
- consultants to EEAA participates in working groups instead of in ad-hoc meetings

EIMP

## Institutional Support

| Primary, long term cooperating partners for EIMP/EEAA | Secondary cooperating partners |
|---|---|
| | •IDSC (advice on database development)<br>•IDSC (advice on data transfer)<br>•EETP (training) |

EIMP

## Coastal Water Monitoring

| Primary, long term cooperating partners for EIMP/EEAA | Secondary cooperating partners |
|---|---|
| • National Institute of Oceanography and Fisheries (NIOF), Alexandria and Suez offices<br>• NRC RefLab | Not foreseen at the moment |

EIMP

## Air Pollution Monitoring

| Primary, long term cooperating partner for EIMP/EEAA | Secondary cooperating partners |
|---|---|
| Ministry of Health<br>• Embaba Laboratories,<br>• Alexandria Laboratories<br>• Regional Laboratories<br>• NRC RefLab | • University of Alex Dr El Raey (technical advice to MOH, Alex)<br>• University of Cairo, (data from 1 automatic station)<br>• Atomic Energy Agency (data from 2 Cairo stations, common use of monitoring sites, training)<br>• IDSC (adv. data transfer)<br>• Tabbin Institute (data from 1 automatic station) |

EIMP

## Point source database & monit.

| Primary, long term cooperating partners for EIMP/EEAA | Secondary cooperating partners |
|---|---|
| • Tabbin Institute (air emissions and wastewater discharge)<br>• NRC RefLab | • IDSC (administrative data, index numbers etc.)<br>• IDSC (advice on data transfer)<br>• GOFI (engineering data) |

EIMP

## Reference Laboratory

| Primary, long term cooperating partner for EIMP/EEAA | Secondary cooperating partners |
|---|---|
| National Research Centre (NRC)<br>• RefLab Air<br>• RefLab Water | None foreseen at the moment |

EIMP

## Contract format for primary cooperating partners

- FRAMEWORK
- Definitions and Interpretation
- Obligations of the Consultant
- Obligations of the Client
- Personnel
- Liability and insurance
- Commencement, completion, alteration and termination of the agreement
- Payment
- General provisions
- WORK ORDER (SPECIFIC)
- Scope of services
- monitoring programme with locations, frequencies, parameters
- analyses, data storage and quality control
- record keeping and management
- list of equipment and services of others to be provided by client
- payments and payment schedules

EIMP

## Contract preparations

- contract format decision (FIDIC Standard proposed)
- scope of monitoring programmes in detail, Standard Operating Procedures ready at institution, data formats and reporting schdules described
- cost assessed and subsequently negotiated with the monitoring institutions
- monitoring programmes approved by relevant working groups
- draft contracts approved by the EIMP Steering Committee

EIMP

## Annual Plan of Action 1996

- Prepared as draft in February 1996 by EIMP Task Managers
- Annual Plan of Action 1996 is a review of the Project Document with extended descriptions of the outputs and activities required for Phase 1
- Annual Plan of Action 1996 is reflected in the monthly progress reports as the baseline activity time schedule

EIMP

# Air Pollution Monitoring

| Primary, long term cooperating partner for EIMP/EEAA | Secondary cooperating partners |
|---|---|
| Ministry of Health<br>• Embaba Laboratories.<br>• Alexandria Laboratories<br>• Regional Laboratories<br>• NRC RefLab | • University of Alex., Dr El Raey (technical advice to MOH, Alex)<br>• University of Cairo, (data from 1 automatic station)<br>• Atomic Energy Agency (data from 2 Cairo stations, common use of monitoring sites, training)<br>• IDSC (adv. data transfer)<br>• Tabbin Institute (data from 1 automatic station) |

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3 Abdel Aziz Selim Street
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ABSTRACT
Summaries of the third mission to Egypt included meetings and site visit reports. Air quality sites in Alexandria have been described as well as comments to earlier selected sites in Cairo.

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| KEYWORDS | | |
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* *Classification*
- *A Unclassified (can be ordered from NILU)*
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- *C Classified (not to be distributed)*