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DANIDA

Air Quality Monitoring Programme

Mission 7 Report

EIMP Environmental Information and Monitoring Programme

NILU Norwegian Institute for Air Research

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DANIDA; Air Quality Monitoring Programme

Mission 7 Report

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1 Introduction

The seventh mission to Egypt was undertaken in September-December 1997.

The EIMP project is funded by Danida and headed by COWI with project leader Jan Hassing. The total project includes four components: Coastal water monitoring (responsible VKI (the Danish Water Quality Institute) and COWI) air pollution monitoring (responsible NILU), reference laboratory (responsible VKI) and pollution sources and emissions (responsible COWI).

The work undertaken during the Autumn of 1997 included more siting studies, the establishment and start up of monitors seminars, workshops and on-the-job training. Monitors and samplers are being checked and installed, additional sites were selected, visited and described. The Air Quality Monitoring Team consisted of B. Sivertsen, Mohamed Nassar and Leif Marsteen. The following tasks are being undertaken, referring to the work programme activities:

B.1.1. Select sites in Upper Egypt and modify some sites selected for greater Cairo area.
C.2.2. Prepare instruments for installation.
D.1.3. Specify data quality check and control procedures.
D.2.2. Establish local database for monitoring data at Monitoring Laboratory.
E.2.1. Prepare training programmes and give seminar and work shops.
E.2.2. Prepare training programme for instrument operation and maintenance.
E.2.3. On-the-job training at Reference Laboratory and Monitoring Laboratory.
E.2.4. Support training at Reference Laboratory.
F.2.1. Specify instrument calibration procedures/standard operational procedures (SOP).
F.2.2. Design QA/QC procedures at Monitoring Laboratory.
F.2.3. Establish SOPs as part of on-the-job training.
G.2.3. Start monitoring programme and data retrieval.
G.3.2. Establish first monitors in Cairo.
G.4.1. Data evaluation at the Monitoring Laboratory.
H.1.1. Installation of monitors at Reference Laboratory.
H.1.2. Calibration of monitors installed.
H.2.1. Train Reference Laboratory personnel in use of monitors and calibration.

The time schedule for most of these tasks depends on the installations done by the local sales representative at Chemical and Technical Services (CTS) who will support the first five installations. These installations will be at the following sites: Tabbin station, Monitoring Laboratory, Computer Centre at Monitoring Laboratory and Reference Laboratory. Finally El Gomhoroya street station will also be prepared for installation, and installed if time permits.

CTS will also assemble all stations at the storage room at Tabbin Institute to check that all parts of the equipment has been received, and that all stations will be able to function adequately.

A time schedule referring to the various activities is given as part of Appendix E. Preparations of SOPs and QA/QC procedures were started but was delayed compared to the original plans sue to installation problems and instrument malfunctions.

Some of the persons we met during mission 7 are presented in Appendix A.

2 Visit to Upper Egypt (B.1. and B.2.)

Two of the sites for Upper Egypt have been visited and described during earlier missions; ElFayum and ElMinya. Possible measurement sites in the areas from Luxor to Aswan were visited by B Sivertsen and M Nasar 15 - 19 October 1997.

2.1 Luxor

In Luxor we had meetings with General secretary of the Governorate Mr. Ibrahim Suleimehah, before visiting the Temple of Karnak and the monuments of the west bank. A number of positions for the application of passive samplers for SO_2 and NO_2 at the historical monuments were selected (see chapter 3.6.).

The main sampling station in Luxor will be located in the central part of the city area. The environmental office in Luxor was visited. After discussions with Chemist Mrs. Laila Arafa, it was decided that the sampling station could be located in the building of the Environmental Office. The site is located only 300 m from the Luxor Temple close to the El Hagagi Square. (see site report Appendix B)

On the West Bank of the river Nile (west of Luxor) we met with General Director Mohamed Nasr. Passive samplers are to be located in the Temple of Ramsis III, in the Valley of Kings and at the Hatshepsut Temple.

During the visit in the Valley of the Kings we met with the Director of Antiquities of the West Bank of Luxor Mr. Mohammed El Bialy.

2.2 Edfu

A sampling site will be selected in the Building and Construction Department of the Aswan Governorate. The site is located about 100m from the bridge crossing the Nile river, and will occasionally be downwind from emission from the iron factories.

Passive samplers for SO_2 and NO_2 will also be located in the Edfu Temple.

2.3 KomOmbo

A monitoring site in the central part of the city of ComOmbo was selected at the Upper Egypt Company for Agriculture, Ministry of Agriculture. We discussed the possibilities with Mr Abdil Gaber Ali.(tel: 097 500 0022) The director of the company is Mr Mohammed Yosef.(tel: 086 551 1641)

The site is highly influenced by the traffic on the main road to Upper Egypt. The site is also located about 500m downwind from the sugar factories.

At the Temple of KomOmbo we discussed with one of the responsible officers at the site, who stressed that we would have to obtain a general permission from the Central Authorities of Culture in Cairo. Passive samplers will be located at two points in and around the KomOmbo Temple. A brick factory is operating only 500m north of the Temple.

2.4 Aswan

A monitoring station included gas monitors and meteorological measurements will be placed at the Susan Mubarak School in the central part of the city. The site is located between the Corniche and Saad Zaglol and is in the middle of the tourist area in the central urban part of the city.

We had meeting with Mrs Fatma Kazim, the Director of the school (tel:303094). She was positive to the location of the air quality monitoring station at the school.

3 The air quality monitoring programme for Egypt (B.2)

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

The programme has taken into account that instruments located far away from the Monitoring institutions have to be visited and serviced at least once a week. We have thus tried to establish an optimal use of on-line monitors. Where possible quality controls can be undertaken daily via telephone communications.

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

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

3.1 The greater Cairo area monitoring programme

The greater Cairo measurement network consists of a total of 12 sites, with a balanced mix of monitors and samplers. There are also assigned 3 on-line weather stations to the network in Cairo; one located in the north east, one in the west and one south of Cairo.

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

Most of the Cairo sites were selected during site visits in April-May 1997. Further evaluations and field measurements using passive samplers in September 1997 resulted in a few modifications in the original programme.

High weekly average concentrations of SO_2 and NO_2 was measured by passive samplers in the Ramses square area in September 1997. A memo containing the results of these measurements are presented in Appendix D as part of the siting studies. The results of the September measurements lead to the location of a urban centre monitoring station in the El Qualali area a few hundred meters west of Ramses railway station. (site report Appendix B).

The road side site originally located at Embaba was moved to Fumm El Khalig downwind from Cairo city centre. The station will be located in a shelter at the southern tip of Garden city, and will be a combined urban and road side station.

Further discussions with the Meteorological office personnel indicated that they have several air quality monitors in operation. The possibilities of combining their ozone monitoring with the EIMP monitoring programme should make the roof site at the Meteorological Institute.

3.2 Air quality measurement sites in Alexandria

Six sites have been selected for Alexandria. Four of these will be equipped with monitors, two are sampling stations. Also one meteorological site has been selected for Alexandria.

The first monitoring site will be installed at the University site at IGSR. This institute will also have the local responsibility for servicing the Alexandria stations and the measurement stations in the western Delta.

3.3 The Delta and the Canal area

As of December 1997 nine sites have been selected in the Delta and in the Canal area, six of these are Delta sites three are in the Canal area.

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

3.4 Background stations

Sites have been selected for background measurements. Most important at these sites are the measurement of tropospheric ozone, which may express the potential for NO_2 formation in urban areas and cities.

The main background station for ozone in the Sinai area will be located at the EEAA laboratory in Ras Mohammed National Park. In Sharm ElSheik we will also include simple measurements of SO_2 and NO_2 using passive sampling during selected periods.

In the future we may select a site for measuring background air quality in Hurghada. The Meteorological Institute has a monitoring site in this region. Ozone may be one of the parameter to record here. Also other integrated sampling values may be collected.

3.5 Upper Egypt

The various sites selected in Upper Egypt are presented above. As of December 1997 it still remains to find the exact positions for measurements in Assyut (two locations) and in Naga Hamadi. These sites will be visited during the spring of 1998.

The site in Naga Hamadi will be located downwind from an aluminium primary smelter. The measurements should include in addition to SO_2, suspended particles and dust fall rates fluoride measurements (HF). These possibilities will be investigated later.

3.6 Measurements at historical monuments

A specific air quality sampling programme has been designed to take care of the background air pollution levels at historical monuments. This type of information has already been requested from the scientific community working with preservation of the cultural heritage.

Passive samplers for the measurements of integrated concentrations (weekly or monthly averages) of SO_2 and NO_2 will be used twice a year at a selection of sites in monument areas.

The first sampling period has been indicated during the Spring of 1998. Details of the sampling programme can be adjusted during the location of the samplers. The sampling programme will typically be as follows:

At the **Giza** plateau samples will be placed near the **Kufu (Cheops)** pyramid and at the **Sphinx**.

At the pyramid complex of **Saqquara** samplers will be placed in the temple area close to the pyramid of Djoser.

In Luxor two sampling sites have been selected in the **Temple of Karnak** and one site was selected in the **Luxor Temple**.

At the monuments of the West Bank at Luxor sampling points were selected at the **Temple of Ramsis III** in Madinat Habu, the **Terrace Temple of Hatshepsut** at Deir el Bahri and at the Office of the Inspectorate in the **Valley of Kings**.

At the **Edfu Temple of Horus** one sampling site was selected along the west wall inside the Temple.

At the Ptolemaic period temple at **KomOmbo** samplers will be placed on an open space at the northern side of the temple.

Samplers will also be located at the **Kiosk of Trajan at Philae** near Aswan and at the **Temple of Ramses II at Abu Simbel**.

4 Equipment, procurement and inventories

4.1 Instrument inventories (C.1, C.2)

The total air quality monitoring programme for Egypt has been planned in details. A final instrument inventory was developed as a basis for further procurement of instruments, equipment and spare parts. The inventory is presented in Appendix F1.

The total costs of instruments available in the Air Pollution Monitoring component is also presented in Appendix F1, given for each institution and for the total amount of instruments available.

The computer resources have been changed during the second Phase of the project. The present situation concerning computers delivered to all monitoring institutions is summerised in Appendix F2.

A total catalogue of equipment included cost values has been prepared and is available as a specific document. Each station Log Book will include this information.

4.2 Instrument Procurements (C.2)

Based upon the inventory list and the present situation concerning monitoring institutions, reference laboratories and input from the Danida mission, a final procurement list concerning the remaining equipment for the Air quality Monitoring Programme has been prepared and is presented in Appendix F3. The list also includes a Procurement Plan.

A total of 2,6 mill. DKK is needed to fulfil the objectives and the requirements of the monitoring programme. The total budget for the Air Quality Monitoring Programme was originally 8,97 mill. DKK.

The first delivery amounted to 6,163 mill DKK out of which 0,682 mill DKK for on behalf of the Reference Lab Air. The planned expenditures for second delivery of instruments for the Air Quality Monitoring Programme including the Reference Laboratory Air needs, has been estimated at 2,624 mill DKK.

The total equipment required includes extra costs caused by various changes in the

management of the Air Monitoring Programme. The Reference Laboratory dealing only with air quality, established at NIS has been equipped with complete sets of monitors and calibration units. In addition it was required and also stressed by the Danida Mission that the Monitoring Laboratory has to be able to check and calibrate their own equipment with a complete set of calibration units and gases needed. This upgrading amounts alone to 0,416 mill DKK. Also an extra monitoring institution was established in Alexandria to take care of the sites in Alexandria and in the Delta. This was not anticipated from the beginning.

In spite of all these additional equipment we have managed to cut down on the budget thanks to a selection of less expensive equipment at some sites, and the use of inexpensive passive samplers as a supplement to the programme. A Memo on the modifications in the second delivery was developed both to explain the background and to justify the less expensive equipment to be ordered from NILU. (Appendix F4).

Also spare parts and consumables have been evaluated (see Appendix F5), and is presently estimated at a total of 327,531.- DKK, which is considerable less than first anticipated. We may have to return for further consumables as the measurements proceed.

5 Instrument installation time schedules (G.2, G.3)

The time schedule for installations of monitors and samplers in Egypt has been discussed, modified, re-evaluated and changed several times. The first problem appeared when the equipment could not be released from the customs in Alexandria and at the Cairo Airport. This has delayed the original installation schedule by 6 months.

After completing the first installation at Tabbin Institute we developed an installation time schedule for the remaining of the EIMP programme. (see Appendix E).

5.1 Installation and instrument problems

As soon as the measurements should have started at Tabbin Institute and at the Monitoring Laboratory at Cairo University problems turned up, as the equipment did not function according to specifications. The responsibility for installation of the first 4 sites, included instructions and training, is at the instrument supplier Kontram and its local representative CTS, represented by Mr A. ElSoueini.

An expert, Harry Granath, had to be called from Kontram in Finland to have the gas monitors properly calibrated. An expert from Thermo Environment had to be called for checking the PM_{10} monitor and Bill Hayes from EMC had to visit the Tabbin Institute station to correct the soft ware in the main computer.

Various questions regarding the instruments and the installations were sent to CTS and Kontram on 11 November 1997. Some of the major problems and questions concerning deliveries were specified as presented in Appendix E2. Most of the problems and questions were also repeated in several air pollution monitoring staff meetings. Minutes from these meetings are presented in Appendix K.

The first site installation

The measurements at Tabbin Institute started on 27 October 1997, after the opening of the station by the Minister for Environmental Affairs. Data were

collected on diskettes and evaluated. An example of one week of data is shown in Appendix O.

Also the station manager was used to identify that there were problems in the reading of PM_{10} concentrations. The problems seemed to be a combination of mechanical problems and calibration procedures.

After re-calibrations and check of the meteorological data, the gas monitors and the Automatic Weather station (AWS) seemed to function adequately.

Instruments at Cairo University (G.2.3)

All monitors at the Monitoring Laboratory at CEHM were installed and calibrated on 6 November 1997. The monitors at the measurement site at Cairo University were installed and calibrated at the end of November, but no data were retrieved and studied as of first week of December 1997.

Also the PM_{10} monitor inside the monitoring laboratory seemed to give very high values. Mechanical problems also occurred occasionally. In December it was still stated that the problems would be fixed as soon as possible.

Installation at the Reference Laboratory (H1, H2)

The installation of monitors at the Reference Laboratory started on 23 November. Calibrations were undertaken into the first week of December 1997. At the beginning of Phase 3 the Reference Laboratory personnel will receive training and will have to start calibrations of new monitors.

Data management and QA (D.1, F.2, F3)

Data retrieval (D.1)

Different types of data will be collected by the monitoring programme. The first specification of the data collection procedures were developed in Phase 1. The daily data retrieval and quality control procedures should be undertaken by the System Manager delivered to the Monitoring Laboratory. Problems and errors occurred both on the Station Manager and the System Manager which required that the training in daily operation and QA had to be postponed.

For air quality data collected by samplers, the various sampling procedures and data collection and analyses procedures will be developed during 1998. A first instructions were given to enable simple operations for training purposes.

Communication lines (D1.5.)

Dr M Nassar had meetings with the National Authority for Communication (NAC) at Ramses street Cairo concerning lines for data transfer. NAC have a network for data communication that could be used by EEAA/EIMP for transferring data from the monitoring sites to the central computer at the

Monitoring Laboratory. In the future the network can also be used to transfer the data to EEAA. This solution is presently probably the best one available in Egypt. NAC was also positive to the EEAA application.

A meeting was also held with the communication consultant at EEAA, Dr. Abdel Rahman, based upon a request from Dr. ElZarka. Dr. Rahman will discuss the matter further with NAC.

5.2 Data quality control (F.2)

The technical tools will be supported by quality control descriptions , manuals and reporting procedures. Log books will be established for each instrument at each station. The laboratory routine data monitoring, retrieval ,storage and quality control will start as soon as the data systems are up and operating and when the instruments are installed, calibrated and operated.

A complete list of Standard Operational Procedures Manuals to be developed as part of the EIMP programme is presented in Appendix E4. Some of the calibration procedures were developed during 1997.

The training in Phase 3 will include all participating air quality data collecting institutions as on-the job training.

Manuals and reporting procedures for collected samples analysed in the analytical lab will be developed. This development will take place at the end of 1998. This work will also be done as an on-the-job training effort. As part of the quality controls proficiency tests will be prepared by the Reference Laboratory.

6 Training programmes (E)

Training includes all parts of the Air Quality Monitoring Programme; The Task Manager (Counterpart), the Monitoring Laboratory staff and the Reference Laboratory staff. Some of this training was discussed and prepared in Mission report 5.

6.1 Task Manager (Counterpart) Training Programme (A3)

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

As an important part of his training programme was the visit to the Norwegian Institute for Air Research (NILU) at Kjeller, Norway from Monday 4 August to Friday 15 August 1997. The siting studies, participating in seminars and workshops have also been an important part of this training.

Seminar (E.4)

An introductory seminar has been prepared for the EIMP air pollution monitoring staff. This seminar was to be held at the beginning of the measurement phase. The seminar was set for 27 October 1997 at Tabbin Institute, and was opened by H.E. Minister of State for Environmental Affairs, Mrs. Nadia Makram Ebeid.

The seminar represented an introduction to the air quality monitoring for Egypt. As part of the seminar the first monitoring station in the air quality monitoring system for Egypt was opened by the Minister. The event drew attention from the media, the press and national TV stations. A 20 minute programme on air pollution and the EIMP monitoring programme was presented on one of the channels.

About 100 persons participated in the seminar, which was held over one day. Following the seminar was a 3 day work shop on air pollution monitoring. (The Seminar programme is presented in Appendix G)

Workshop (E 4.1).

The three day work shop held at Tabbin Institute on 28 to 30 October 1997 was intended to give an introduction to modern air pollution monitoring and information systems. All personnel that will be involved in the EIMP air pollution monitoring programme was invited to attend the seminar. (see programme and participants presented in Appendix H).

Among the 20 persons participating in the seminar were personnel from Cairo University, Alexandria University (IGSR), the Reference Laboratory at GIS. Also a few invited persons from the EIMP programme and from Meteorological Institute participated in parts of the work shop.

On-the-job training (E.2).

An on-the-job training programme will be developed for the Monitoring Laboratory personnel, to the monitoring institution's personnel, to selected Reference Laboratory experts and to key personnel at the EEAA, who in the final Phase will receive the data for further application.

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

Training is an essential part of the installations, calibrations and operations of the air quality monitoring programme. An important part of the training programme will be based upon on-the-job training. It is essential that the personnel at the Monitoring Laboratory, who will have the responsibility for the future monitoring system, are aware of their tasks and responsibilities before this training starts.

As a first on-the-job training effort the Monitoring Institution personnel will learn to operate the first monitoring sites at Tabbin and at Cairo University during December 1997 and January 1998. Training under guidance will be resumed after Ramadan at the beginning of February 1998.

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

Spectrometer and Ion Chromatography may be used for special training courses.

A first training in operation of the High Volume samplers starts at the end of 1997. The TSP sampler at Tabbin will collect dust every 6 day. A first instruction in the use of the sampler was given to CEHM.

7 AirQUIS for EEAA (D.3)

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

EEAA will receive, together with quarterly reports, a selection of raw data and aggregated data from the Monitoring Institutions. These data will have to be stored in the EEAA data base for further evaluation, statistical treatment, graphical evaluation and presentations. A number of statistical programme based upon a GIS system has to be made available. This data base system will have to be developed at EEAA or purchased from already developed and commercially available data base systems.

A draft proposal was developed by NILU on 1 April 1997. The proposal included the installation of AirQUIS on one computer. This may function as an application server, with possibility for client installations in the EEAA computer network.

Further information concerning AirQUIS for EEAA/EIMP ambient air monitoring programme is presented in Appendix I.

8 Staff Meetings (I.2)

8.1 The EIMP staff

EIMP staff meetings are held every Sunday. Minutes from some of these meetings are presented in Appendix J.

In the meeting on 9 November it was stated that the installed Coastal Water data base, developed by Ritsec, has taken more time than anticipated. The data base has still not been tested adequately.

An expert from outside has been requested for the Reference Laboratory at NIS. This person has been preliminary appointed as part of the EIMP staff.

8.2 Weekly air quality staff meetings

Weekly meeting of the ambient air monitoring personnel was held since mid October. Minutes from these meetings are made so that status and responsibilities can be recorded. The permanent members of the first meetings, as long as CTS are installing and preparing instruments, are L. Marsteen, B. Sivertsen, M Nasar, T ElAraby, A. ElSoueini. Other experts or responsible persons may be called for the meeting dependent upon needs.

In the meeting on 9 and 16 November it was reported on the work performed by American experts Frank Duckert from Thermo Environment and Bill Hayes from Environmental Measurements Company (EMC). Bill Hayes checked the data logger and data retrieval system.

It was also decided that training in the use of monitors will start with an introductory seminar given by A. ElSoueini on 10 December 1997.

Selected minutes from these meetings are presented in Appendix K. A list of tasks to be undertaken by the Task Manager Counterpart Mohamed Nassar is also attached to Appendix K.

8.3 Meeting with Jan Hassing

A meeting was called with Project Leader Jan Hassing on 11 November to discuss:

1. Working Group Meeting on Air Pollution Monitoring.
   It was decided that the next working group meeting will be arranged after installing the first monitoring station in Alexandria. There are no decisions needed presently from the working group.
2. The total monitoring programme for Egypt has been completed and updated. Future time schedules for installations (preliminary estimates) was presented and discussed (See Appendix E).
3. Total equipment and further needs
   a) Inventory list for all equipment in the Air Quality Monitoring Component.
      The procurement list for the second delivery with prices was presented and discussed. The procurement, and equipment needed in each laboratory were specified. Also a total list of spare-parts and consumables were added. The meeting decided to proceed with the procurement process.
4. A Memo describing the ambient air pollution data base for EEAA, (AirQUIS) was presented. (See Appendix I). There seems to be no other possibilities for the EIMP programme at the moment, than to obtain AirQUIS as a basis both for the emission component and for the ambient air component. Final decisions will be taken later. The plans for Phase 3 were, however, based upon the installation of AirQUIS at EEAA in 1998.

9 Cairo Air Improvement Project

The USAid Cairo Air Improvement Project (CAIP) moved into the EEAA office on the same floor as the EIMP programme. A first meeting with the EIMP Air Pollution Monitoring Component was called on 4 November 1997.

The CAIP is divided into 6 sub objectives (SO):

SO1: Vehicle emission testing

SO2: Change to Natural Gas in buses

SO3: Environmental impact of lead smelters

SO4: Air Monitoring

SO5: Communication and information

SO6: Procurement and various special studies

The project has a total budget of 50 mill USD over 5 years, about 3,2, mill. USD will be used on air monitoring (2 mill. USD for equipment). The need for co-ordination between CAIP and EIMP was stressed. Monitoring sites, measurements and analyses should be co-ordinated. Both parts wants to have maximum benefits from both networks.

CAIP will undertake a large number of high volume sampling of particles. Analyses will be undertaken at Cairo University (contact person Hisham ElAraby) and out Reference Laboratory at NIS should be used to calibrate all air flows.

Also the data base for manually collected particle samples will be at Cairo University. This also will have to be co-ordinated. An Access type data base would be adequate for all programmes and will be transferable into a data base at EEAA.

A second meeting was called on 13 November with Alan Gertler from Desert Research Institute and Jim Howes. They requested the details of the future EEAA database. Common training at the Monitoring Laboratory at Cairo University was stressed again. CAIP has selected 4 sites in Cairo (political

selections) to start particle sampling with simple AirMetrics samplers, originally designed for indoor air quality. They will take 24 h average samples every 3 day on Teflon filters to analyse multi elements by XRF. The objective is to perform some simple Chemical Mass Balance analyses (CMB).

10 Co-operation with Meteorological Authority (B.1, C.1)

The Meteorological Authority is operating an Air Quality Monitoring station at the roof of the buildings in Abbasiya Cairo. We visited the institute on 12 November 1997, and met with Dr Abdel Moneim A. Ibrahim, Chairman of the Board of Directors. We also discussed possible co-ordination with Darwish M. Ahmed, Abdel Raof, Director of Research, and Hesham Helmy El-Sayed.

All monitors were at present inside the laboratory for repair and calibration. The instruments were delivered by ThermoEnvironment / ElSoueini SO_2 and NOx in 1993 and ozone in 1995. Tropospheric ozone is measured also in Hurghada and at Sedi Barrana (north western Mediterranean coast). At the institute in Cairo they also measure TSP by a German made (Strohlen) High volume sample with flow rate 30 m3/h.

Dr. A.M.A.Ibrahim together with the air pollution responsible personnel were all very interested in a co-operation with EIMP/EEAA for air quality and meteorological measurements. We suggested that the air quality measurements were updated and modernised with data loggers and data transfer systems, and that the meteorological mast with more sensitive sensors, like the one used by EIMP, is placed at the roof next to the air quality monitors. In this way the Meteorological Authority location will act as one of the measurement stations in the EEAA/EIMP network (see site report Appendix B)

Dr Ibrahim was also interested in total ozone and UV measurements. The newly developed NILU UV monitor was mentioned. More information about this instrument will be provided from NILU.

11 Annual plans and annual reports (I.1, I.3)

Annual plans for Phase 3, 1998 and an Annual Report for Phase 2, 1997 was developed. The work plan for air pollution monitoring is presented in Appendix L1.

The work plan is based upon the Activities presented in the updated Logical Framework Table. The expatriate staff during the third phase will contain Bjarne Sivertsen (Team Leader Air Monitoring), Leif Marsteen (Monitoring Expert Ambient Air), Oddvar Røyset (Sampling and chemical analyses expert) and Atle Riise (Database expert).

We have assumed that a data base for ambient air pollution data will be based upon the system established for the point source emission inventory; AirQUIS.

The NILU expert on sample preparations and chemical analyses will be needed to undertake training and start up of the sampling programme from the second part of Phase 3. He will also undertake all training concerning filter preparations and chemical analyses.

The annual summary report for 1997 was also presented. The report this year does not contain a number of Appendixes as was the case for the 1996 report. References are made to the Mission reports included their Appendix reports and Procurement Documents, Manuals, Log books and Operational Procedures developed for the EIMP programme.

12 Various matters

12.1 Carbon Black factory Impact Assessment

B. Sivertsen was called to participate in a visit to the Carbon Black Factory in Alexandria on 6 November 1997. The factory was visited by Mohammed ElZarka, EEAA, Dr ElRaey from IGSR Alexandria University and Dr Fatma Abou Shouk from Alexandria Governorate.

Several complaints about ambient air pollution impacts have been filed against the factory, and the minister of Environment wanted to shut down the factory. However, the size of the problem seemed to be smaller than first anticipated. We have seen much larger air pollution problems in other area of Egypt (Shoubra ElKheima and Helwan/Tabbin) than this one.

The problem at Carbon Black is, however, complicated as soot particles occasionally (a few times per year), can be released into the atmosphere and deposited on plants in the down wind area. It has mainly been complaints from farmers in a fairly small area only 100 to 400 m away from the plant, but NOT in the prevailing wind direction.

From data and reports made available average concentrations will probably not exceed air quality standards of Egypt. A memo prepared during the meetings is presented in Appendix M.

12.2 Compliance action plans

Based on request from the Minister of Environment a plan for targeting some of the industries in Egypt that not comply with the Environmental Law is being developed.

As part of this work B. Sivertsen was called to a meeting at Dr ElZarka's office on 9 November 1997. In the meeting were also Jim Howes form the CAIP project, Alec Estlander from the Finnida/EPAP project and Dr Hamza EEAA.

The report from our visit to Carbon Black in Alexandria was referred. Based on a limited capacity and experience the Agency need to do something to show its seriousness concerning the compliance to the Environment Law of Egypt.

There are some visible cases of clear violence, linked to industries with no commitment to reduce the emissions. Six major facilities have been selected for further studies with the goal of enforcing the law by implementing measures or closing the factories. These are the Delta Steel in Shoubra ElKheima (air pollution), Starge and Glycose Cairo (water pollution), Nasr Coke, Tabbin (Air Pollution), Masr Milk, Cairo (water pollution), Carbon Black, Alexandria (Air Pollution), Salt and Soda, Kafr elZayat.

The objective of field studies would be to establish a Complience Action Plan (CAP). This work is under way and will be established at 200 factories all over Egypt. EEAA need at present evidence that these factories enforcing the Law. At the selected 6 factories it is necessary in the very near future to start monitoring and testing to be able to enforce Law 494.

12.3 Air quality data from Egypt to the WHO/AMIS programme

In a Fax to Dietrich Schwela, the Head of the WHO/AMIS (Air Monitoring and Information System) we have informed him that our first modern monitoring station in Egypt (Cairo area) was opened by the new Minister for Environmental Affairs on 27 October 1997. The Head of Environmental Quality Sector in EEAA, Dr. ElZarka is interested in supporting the WHO/AMIS programme with good quality air quality data from Egypt. (See Memo about global network attached in Appendix N).

It was further reported that the Egyptian expert in the project, who will be responsible for these data at EEAA, is Dr. Mohamed Nasar. We suggested that WHO contacted him at EEAA (the EIMP programme) for further information about the network and the possibilities. He already has received a copy of the AMIS information CD.

Appendix A

People we met

Names and adresses in Egypt (EIMP)

Office:EIMP,3 EEAA Building, 30 Helwan Str.
Maadi, Cairo (behind Sofitel hotel) ,
Tel. 202 351 0970, Fax: 202 378 5478
Minister of Env. Affairs Mrs Nadia Makram Ebeid
Staff: Dr Mohammed Nasar (AQ) , tel 351 5174
Mohammed Fathi,(PM), Anwar Ahmed (proc),
Sherine Khaliw (coast w), Sherif Hassan (reflab),
Gihane Bayoummi (emiss), Mohammed Zaki (EDB)
Dina, Lydia, Hassan, Mahmoud, Emad, Samir,
Email: jhassing@powermail.intouch.com
eimp@intouch.com
Hassing private: tel: 202 340 5741
D Clarke, 23 road 84, Apt 62, Maadi.
Ulla Lund, Arne Jensen, Jacob Andersen,
Jørn Rødkær, Kirsten (reflab), Suzanne(wastewater)
EEAA,Dr. Ibrahim Abdel Gelil (Chairman)
Dr. Mohamed el Zarka (Jan's counterpart)
Dr. Abdil Latif Hafez (Air Quality respons.)
Ms Heba Mohammed Adly, (Env. researcher).
Mrs Hoda Hanaffi (head of GIS),

Cairo University, CEHM (c. env. haz. mitig.)
Dr Sharkawi, Dr Tarek El Arabi, tel 571 9688
Dr. Hesham ElArabi
TIMS, Tabbin- Helwan (tel:5010170)
Dr. Said Khalil. dr. Hassan Hamad
Sayed Ebed (air poll lab.)
NRC; Shari el Tahrir, Dokki Square,
Dr Nabir Saleh (dir)
prof,. M. Nasrallah, tel 3537299, Fax 3370931
Institute of Graduate Studies and Research
Univ of Alexandria, Prof M El-Raey, tel:422 7688 ,
Fax 203 421 5792, Dr. Sai Shallaby, Ashraf A Zahra,
Ain Shams Univ; Dr Saad Hassan
JICA Minilabs.Dr Mawaheb Abov el Azm
Atomic Energy Authority
Dr Hisham Fouad Aly, 101 Kasr el Eini str.
Dr Mokhtar Hamza (rad.network)
tel: 274 0236 fax: 274 0238
Env.Mon. Centre, EMBABA, Dr. Seham M.H. Hendy
tel: 311 8978, Mr. M.J Refaye, tel: 311 9691
Met. Inst: Mr D.M. Ahmed
High Institute of Public Health, Univ. Alexandria
Dr Kamel Noer, Ms. Marvet Amin (models) Fax: 421 5792

President hotel. 22 Taha Hussein street
Zamalek, tel. 202 3400718, fax: 202 34 11 752
Sofitel Hotel: Maadi
Tel: 202 350 6092, Fax: 202 350 6209
Ambassader:
Norge: Al Gazira al Wusta str.
Amassadør: Mette Ravn, 2.sekr.Kathrine Rath
tel.340 3340 , fax: 342 0709
Danmark: 12 hassan Sabri, Zamalek
John Carstensen 378 2040
COWI: 00 45 45 97 22 11
Leif Marsteen 13/86 Maadi
Alec Estlander (FINIDA/EPAP) 012 214 2733
ASAID - CAIP: Jim Howes
ETS: Amr ElSoueini, t 355 2560, mob. 012 216 6679, Ali

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Air Quality Monitoring Systems and its Applications
Tabbin 28 30 October 1997

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Maher Ibrahim Sayed	CEHM
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Kamla Moustafa Ragheb	CEHM
Mahmoud Mohamed	CEHM
Dr. Mahmoud Fathy Mohamed	NIS/Danida
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Dr. Adel Bassouni Shehata	NIS
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Appendix B

Siting study

Air quality monitoring network
Site visit report

Site Name: Meteorological Authority
Coordinates:. UTM: 335.5 , 3328.1

Access/ availability: The station is located at one of the buildings of the Meteorological Authority near Abbasiya

Buildings and rooms available:. The monitors are located in a small "shelter building" on top of the roof. Just outside the room will be locations for high volume samplers and meteorological mast.

Area description: Regional residential area normally up-wind from Cairo city centre, but down-wind from the Shoubra industrial area and Shoubra urban area.

Local sources: No immediate local sources, but regionally exposed

Representativity: The site is representative for a the regional urban area.

Parameters measured: Ozone!, NOx, SO_2 , PM_{10} , (TSP?) and meteorology.

Measurement equipment:. Monitors will be linked to telephone lines.

Infrastructure: Power: 220 V available in the room.
Telephone lines: New line has to be installed .
Sampler/monitor locations: In the "shelter".
Air intake: Intake about 1 m from the wall at the roof about 10 m above street level

Personnel: Local contact Dr. Danwid M Ahmed and Mr Hesham Helmy El-Sayed.

Air quality monitoring network
Site visit report

Site Name: Fumm Al-Khalig
Co-ordinates:. UTM: 329.0 , 3322.5

Access/ availability: Inside a park at the corner of Quasr al-Ainy and the Corniche al-Nil. Parkeng at the fence.

Buildings and rooms available: A shelter will be placed inside fence. First priority is at western entrance (at Corniche), second priori at the north eastern corner (near Quasr Al-Ainy).

Area description: Urban centre road side monitoring station with dense traffic on the streets on both sides of the site.

Local sources: The area is expected to be highly polluted from traffic on two main roads and down wind from the city centre of Cairo and down wind from Garden City. The measurements will be important to characterise the general pollution level in Cairo.

Representativity: Representative for the urban central part of Cairo and specifically near two main roads.

Parameters to be measured: SO_2 ,NO_2 , PM_{10}, TSP, NMHC, CO plus more.

Measurement equipment: Monitors and samplers located in a shelter.

Infrastructure: Power: Will be made available
Telephone lines: Has to be obtained.
Sampler/monitor locations: In shelter.
Air intake: 2 m above the ground.

Personnel:. The Governorate of Cairo will be contacted for permissions.

Air quality monitoring network
Site visit report

Site Name: al Gumhuriyyah Street
Coordinates:. UTM: 330.6 , 3325.35

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

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

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

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

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

Parameters measured: NOx, SO_2 , NMHC, CO.

Measurement equipment:. Monitors linked to telephone lines.

Infrastructure: Power: 220 V available in the room.
Telephone lines: New line has to be installed .
Sampler/monitor locations: On shelf in the shalter.
. **Air intake**: Intake about 1 m from the wall lowered to about 3 m above the street..

Personnel: Local contact Mr Hassan Mohammed (security).

Air quality monitoring network
Site visit report

Site Name: Qulaly square
Co-ordinates:. UTM: 330.2 , 3327.0

Access/ availability: Inside the fence at an open area south of the bridge of Shoubra street and north of the fly over road .

Buildings and rooms available: A shelter will be placed inside fence at the the north eastern corner of the High Institute of Social Service.

Area description: Urban centre with dense traffic on the street coming from Shoubra and crossing streets into Oulaly and to Ramses station.

Local sources: The area is expected to be highly polluted from traffic in the main railway station area of Cairo. There are small industries north of the site and the whole Shoubra area is located upwind in prevailing wind direction.

Representativity: Representative for the urban central part of Cairo.

Parameters to be measured: SO_2 ,NO_2 , PM_{10}, TSP, plus more.

Measurement equipment: Monitors and samplers located in a shelter.

Infrastructure: Power: available
Telephone lines: Has to be obtained.
Sampler/monitor locations: In shelter.
Air intake: 2 m above the ground.

Personnel:. The Institute will be contacted later.

Air quality monitoring network
Site visit report

Site Name: Aswan
Co-ordinates:. UTM:

Access/ availability: Susan Moubarak school for girls, located between Corniche and Saad Zaglol street in the central part of Aswan City.

Buildings and rooms available: The monitoring station will be located in a shelter located on top of the security room at the entrance of the school, next to a busy street.

Area description: Urban/Residential nesr urban centre with traffic (tourist area).

Local sources: Traffic and various city centre sources (open burning?)..

Representativity: Representative for the central part of Aswan, location about 300 m east of the Corniche.

Parameters to be measured: SO_2 and particles.(NO_2 with passive samplers).

Measurement equipment: SO_2 monitor, two filter samplers and passive samplers at selected periods ?.

Infrastructure: Power: new line?
Telephone lines: have to be checked
Sampler/monitor locations: At shelter on small building about 3 m above the ground.
Air intake: 3 m above the ground.

Personnel:. Mrs. Fatma Kazim (Director of the school), Tel: xx 30 30 94

Air quality monitoring network
Site visit report

Site Name: Edfu
Co-ordinates:. UTM:

Access/ availability: At the main road/street on the way to the Horus Temple in Edfu. Only ca.100m away from the bridge, next to the police station.

Buildings and rooms available: A room in the first floor of the Building and Construction Department, Aswan Governerate office will be used.

Area description: Urban/Residential urban centre with traffic on the street coming from the bridge crossing the Nile into Edfu.

Local sources: Traffic and occationally downwind from the iron factory.

Representativity: Representative for the central part of Edfu.

Parameters to be measured: Particles and SO_2 (NO_2 with passive samplers).

Measurement equipment: Sequential sampler, two filter samplers and passive samplers at selected periods ?.

Infrastructure: Power: available
Telephone lines: not needed
Sampler/monitor locations: At room on first floor.
. **Air intake**: 3 m above the ground.

Personnel:. ?

Air quality monitoring network
Site visit report

Site Name: KomOmbo
Co-ordinates:. UTM:

Access/ availability: The Upper Egypt Company for Agriculture (Ministry of Agriculture) is located next to the main road to Upper Egypt. The gate leads directly from the street (road) to the main entrance only 10 m from the road.

Buildings and rooms available: The sequential sampler can be located in a small room to the left of the entrance.

Area description: Polluted city centre close to a main road.

Local sources: Traffic, various city centre sources (open burning?).and occasionally 500 m downwind from a large sugar factory.

Representativity: Representative for the highly trafficked central (polluted) part of ComOmbo.

Parameters to be measured: SO_2 and particles.(NO_2 with passive samplers).

Measurement equipment: SO_2 sequential sampler, high olume sampler and passive samplers at selected periods.

Infrastructure: Power: available
Telephone lines: have to be checked
Sampler/monitor locations: Sequential sampler in the small room first floor at entrance, intake through wall. High volume sampler at the roof 5 m above the surface.
. **Air intake**: For sequential sampler 2 m above the ground.

Personnel:. Mr. Abdil Gaber Ali Tel: 097 50 0022
Director of the Upper Egypt Company for Agriculture; Mohamed Yosef , Tel. 086 55 1641

Air quality monitoring network
Site visit report

Site Name: Luxor
Co-ordinates:. UTM:

Access/ availability: Narrow streets between railway station and Namil Hagagi square (east of Luxor Temple) in the city centre of Luxor

Buildings and rooms available: A room for the sampler will be made available.

Area description: Urban/Residential urban centre with traffic on the main street connecting the railway station and Namil Hagagi square.

Local sources: Traffic and various city centre sources (open burning?)..

Representativity: Representative for the central part of Luxor, location about 300 m east of Luxor Temple.

Parameters to be measured: Particles and SO_2 (NO_2 with passive samplers).

Measurement equipment: Sequential sampler, two filter samplers and passive samplers at selected periods ?.

Infrastructure: Power: available
Telephone lines: not needed
Sampler/monitor locations: At room on second or third floor.
. **Air intake**: 6 m above the ground.

Personnel:. Chemist Mrs. Laila Arafa, Tel: 63 87 6913

Appendix C

Air Quality Monitoring Programme and Installation Schedule

EIMP Air Quality Monitoring Programme
Location of instruments

				Monitors							Samplers							
	Site name	Area type		SO2	NOx	PM	HC	O3	CO	Met	PM	TSP	VOC	SO2	NO2	2F	PS	DF
	Cairo																	
1	Cairo city El Qualaly	Urban centre	S	1	1	1						1	1					
2	El Gemhoroya street	Street canyon		1	1		1	1	1							1		
3	Meteorological Inst	Urban / Res.		1				1		1								
4	Nasr City	Residential									1			1	1			
5	Maadi(police station)	Residential	(S)	1	1	1												
6	Tabbin	Industrial		1	1	1				1		1						1
7	Tabbin south	Industrial	ss									1	1	1				1
8	Fum Al-Khalig	Road side/urban	S	1	1		1		1		1							
9	Abu Zabel	Industry/res															2	1
10	Shoubra el Kheima.	Industrial		1		1							1		1	1		1
11	Giza, Cairo University	Residential		1	1			1		1								
12	Gizapyramid	Regional															2	
13	6 October	Res/industrial									1			1	1			
14	10 Ramadan	Res/industrial									1			1			2	1
	Canal area																	
15	Suez	industrial/res.	S	1	1							1						1
16	Port Said	Residential														1	2	
17	Ismailia	residential														1	2	
	Upper Egypt																	
18	El Fayum	urban															2	1
19	El Minya	Res./ Industrial														1	2	1
20	Assyut 1	industrial/ res.	S	1	1					1		1						
21	Assyut 2	residential/urban															2	1
22	Naga Hammadi	industrial/res														1		1
23	Luxor	urban/residential												1			2	1
24	Edfu	Industry/urban.												1			2	1
25	Kom Ombo	industrial														1	2	
26	Aswan	urban/residential.		1				1		1							1	1
	Sinai Area																	
27	Sharm ElSheik	background						1								1		1
	Number of instruments *(this page)*			11	8	4	2	5	2	5	4	5	3	6	3	8	23	14

EIMP Air Quality Monitoring Programme
Location of instruments

			Monitors							Samplers							
Site name	**Area type**		SO2	NOx	PM	HC	O3	CO	Met	PM	TSP	VOC	SO2	NO2	2F	PS	DF
Alexandria																	
28 Abu Keir College	Industrial		1	1						1							1
29 El-Max Petrogas	Industrial	ss								1		1	1	1			1
30 IGSR, Alex University	Urban/road side	S	1	1	1	1		1	1								
31 El-Azafra-El Azhar Univ	Residential	ss											1	1	1		
32 Gheat El-Inab school	Residential	ss								1			1	1			
33 NIOF	outside city						1										
Delta Area																	
34 Damanhur	industrial/res	ss											1		1	1	1
35 Kafr el Zayet	industrial/res	S	1	1	1												1
36 Tanta	urban												1		1		
37 ElMahalla El Kubra	industrial/res.	ss	1		1												1
38 El Mansura	industrial/res.	ss	1	1								1					1
39 Domyat	resid								1	1			1				1
Instr. Alex+Delta			5	4	3	1	1	1	2	4	0	2	6	3	3	1	7
Instr Cairo+C+UE+S			11	8	4	2	5	2	5	4	5	3	6	3	8	23	14
Instr. at Ref Lab			1	1		1	1	1									
Instr. at Mon Lab			1	1		1		1									
Instr. at other institutions			1	1			2		1								
Backup instr.			1	1	1		1		1	1		1	1	1	1		1
Number of instruments needed			18	14	8	5	6	5	7	9	5	6	13	7	12	24	22
	Instrum ordered		18	14	9	5	7	5	7	10	5		*13*	*7*	*12*		*22*

S = shelter ,(2m x 2m x 2.10 m)
ss = small shelter (1,5m x 1,5m x2m)

EIMP Air Quality Monitoring Programme

Time schedule for installations

				1998 (month)												1999 (month)										
Site name		**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**
Cairo																										
1 Cairo city El Qualaly.	Sh					m																				
2 El Gemhoroya street				m																						
3 Meteorological Inst											m															
4 Nasr City								s																		
5 Maadi(police station)	(sh)						m																			
6 Tabbin		m																								
7 Tabbin south	sh								s																	
8 Fum El Khalig	Sh											m														
9 Abu Zabel								s																		
10 Shoubra el Kheima.						m																				
11 Giza, Cairo University.		m	m																							
12 Gizapyramid							p							p												
13 6 October										s																
14 10 Ramadan											s															
Canal area																										
15 Suez	Sh															m										
16 Port Said															s											
17 Ismailia															s											
Upper Egypt																										
18 El Fayum														s												
19 El Minya														s												
20 Assyut 1	Sh																			m						
21 Assyut 2																					s					
22 Naga Hammadi																								s		
23 Luxor							p							p							s					
24 Edfu							p							p								s				
25 Kom Ombo							p							p								s				
26 Aswan							p							p									m			
Sinai Area																										
27 Sharm ElSheik							p											m								

EIMP Air Quality Monitoring Programme

Time plan for installations

				1998												1999											
Site name		**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**
Alexandria																										
28 Abu Keir College													m													
29 El-Max Petrogas	sh													s												
30 IGSR, Alex University	Sh				m																					
31 El-Azafra-El Azhar Univer	sh													s												
32 Gheat El-Inab school	sh													s												
33 NIOF													m													
Delta Area																										
34 Damanhur	sh																s									
35 Kafr el Zayet	Sh																m									
36 Tanta																		s								
37 ElMahalla El Kubra	sh																	m								
38 El Mansura	sh																		m							
39 Domyat																			s	m						
Instr. at Ref Lab		m	m																							
Instr. at Mon Lab		m																								

m = monitoring station (monitors)
s = sampling station
p = passive sampling

Sh = shelter (2m x 2m x 2,10 m)
sh = shelter (1,5 m x 1,5m x 2 m)

Appendix D

Air Quality Sampling in Shoubra El-Kheima

Environmental Information and Monitoring Programme
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 351 0970, Fax: 202 378 5478

Memo

Air Quality Sampling in Shoubra El-Kheima area September 1997

Bjarne Sivertsen, Mohamed Nassar EEAA/EIMP

Introduction

Simple integrated samples of SO_2 and NO_2 have been collected using passive samplers in the Cairo area during two separate periods in June 1996 and in September 1997. The June 1996 data is attached and has been presented to the EIMP working group meeting.

The results from June 1996 covered the central and southern part of Cairo adequately. It was, however, pointed out that further information should have been collected in the northern areas of Cairo and particularly in the Shoubra El-Kheima area. The samples collected in September 1997 attempted to fill this gap of information.

The samples were collected by B Sivertsen and M Nassar as part of the EIMP/EEAA siting study for air quality monitoring stations in greater Cairo area. The samples were analysed at NILU.

The passive samplers

A sensitive diffusion sampler for SO_2 and NO_2 has been used in several investigations undertaken by NILU. One of these studies using the SO_2 sampler covered the Helwan area south of Cairo.

The sampler includes an impregnated filter inside a small plastic tube. Gases are transported and collected by molecular diffusion. The uptake rate is only dependent upon the diffusion rate of the gas. The collection rate is thus 31 l/24h for SO_2 and 36 l/24h for NO_2 .

The typical measuring ranges are 0,1-80 ppb for SO_2 for a sampling period of one month. The corresponding range for NO_2 is 0.02-40 ppb. After exposure the samplers

are brought to NILU for analyses. SO_2 is determined as sulphate by ion chromatography. NO_2 is determined by spectrophotometry.

Sampling points

The measurements in the northern part of Cairo were carried out for five days from 3 September to 8 September 1997. Eleven sampling points were selected for SO_2 measurements; seven in the south eastern Shoubra El-Kheima area, one in AbuZabel, one in Al-Qulaly and one in Gemoroya street. Eight of the samples were retrieved. Four sampling points for NO_2 were selected, three of them were retrieved. (see attached sketch of map).

Results

As shown in Table 1 the SO_2 concentrations ranged from 29 µg/m^3 at Abu Zabel to 554 µg/m^3 Ismailia Canal 400 m south of Arab Contractors at the Water Treatment plant in Northern Cairo.

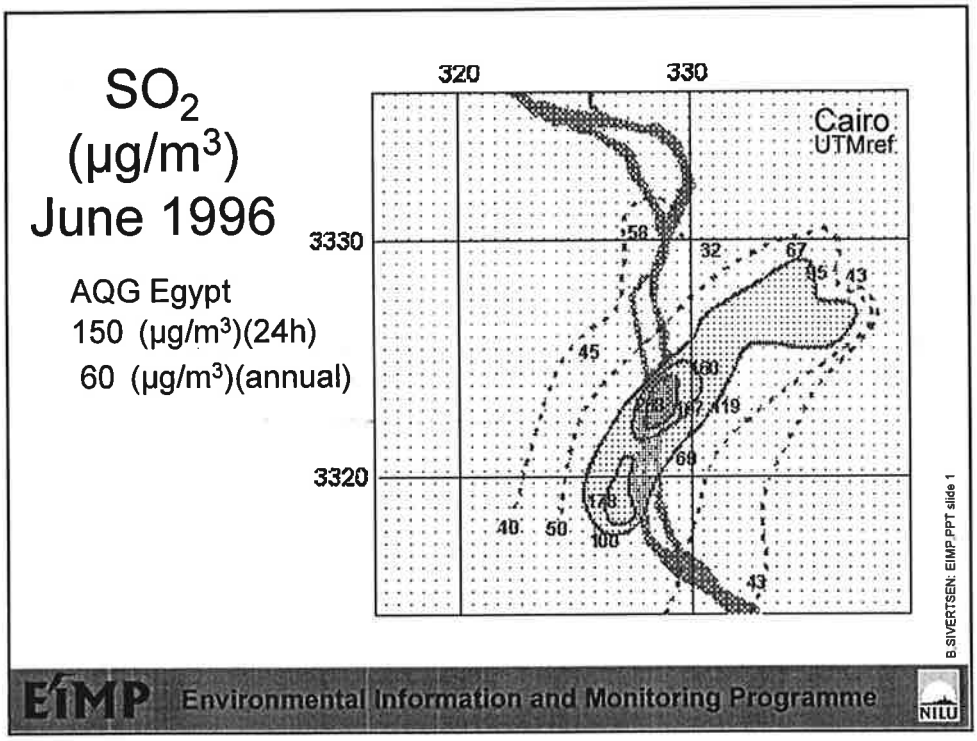
Table 1: Concentrations of SO_2 and NO_2 (µg/m^3) analysed in passive samples collected from 3 September to 8 September 1997

Measurement site	UTM reference X	UTM reference Y	SO_2 (µg/m^3)	NO_2 (µg/m^3)
Ahmed Shahalan school	641.0	3332.4	148	31
Arab Contractors	641.2	3332.45	72	-
Ismailia canal, water treatm.	641.3	3332.2	554	-
Ismailia canal 700 m west	640.7	3332.1	188	-
Al Qulaly	638.2	3326.7	258	-
Gemoroya street	638.5	3325.4	137	109
Abu Zabel			29	22

The winds were mainly from northern directions during the sampling period.

The typical average SO_2 concentration expected in the northern Shoubra area, south of Shoubra ElKheima will range between 150 and 500 µg/m^3, and the 24 h average or one hour average concentrations can be expected to exceed these concentrations.

The NO_2 concentrations were only around 30 µg/m^3 as a five day average. Diurnal variations are expected due to changes in traffic. In Gomorya street the five day average was as high as 109 µg/m^3.



The measurements of SO2 using passive samplers from NILU was undertaken during one week; 7 to 14 June 1996.

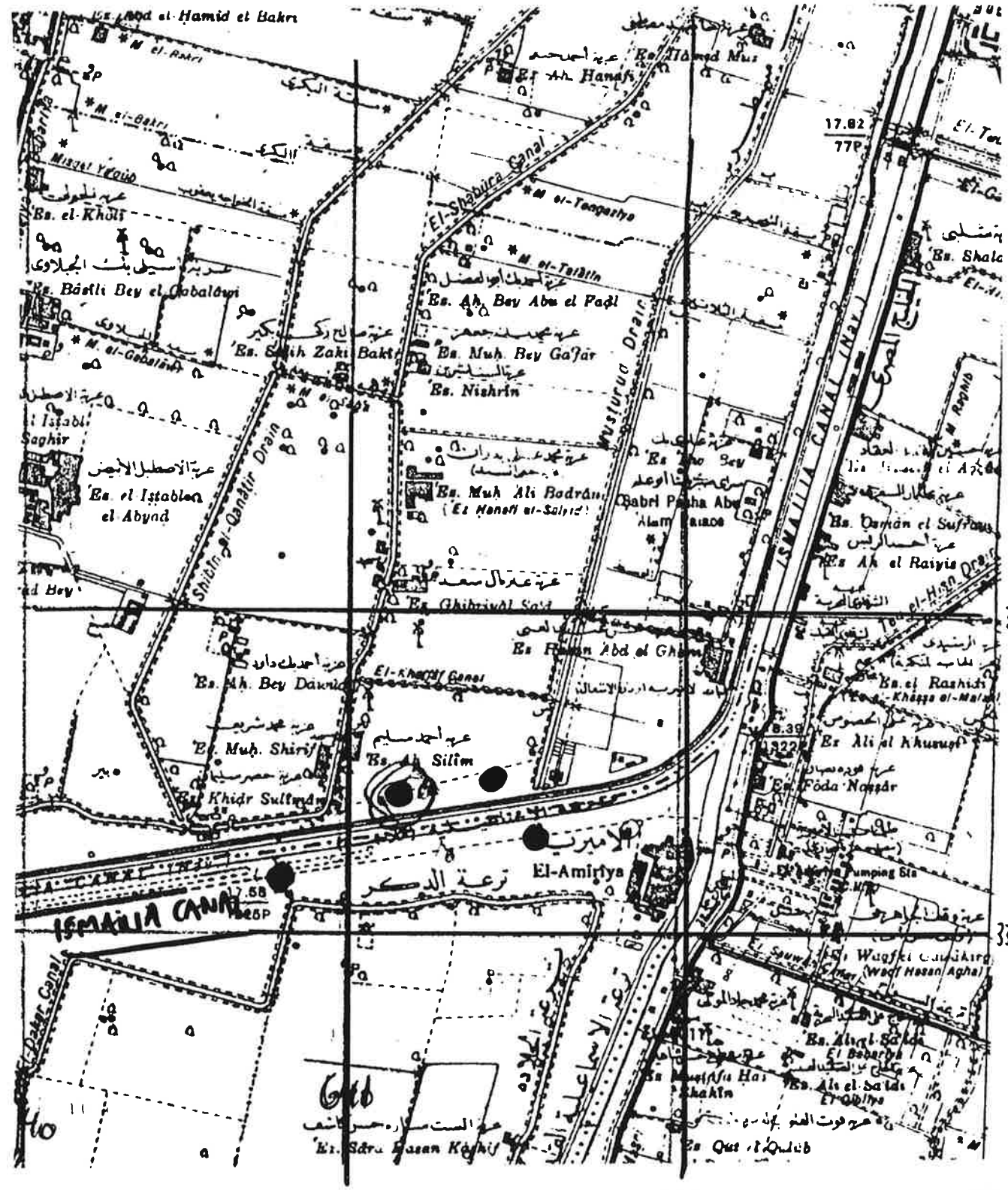
The meteorlogical conditions for the period was typical for summer conditions in Cairo with predominant northerly winds.

The maximum impacted area was found down-wind from the urban city centre of Cairo, around Garden City. A secondary maximum was detected in the area of Umm al-Misryin close to the railwaystation on the western bank of the Nile river, about 4 km south of the Cairo University in Giza. The sampler at this location could be impacted by local emissions.

These measurements did not include data from Shoubra and areas north of Ramses square. To obtain a complete picture of Cairo more samples will be collected in September 1997.

The results from measurements in June 1996 show that the area exceeding 100 ug/m3 covered about 40 km^2 of the central part of Cairo. The air quality limit given in the Egyptian Law is 150 ug/m3 (24 h average) and 60 ug/m3 (as a annual average).

The highest weekly average concentration measured was 208 ug/m3.



Shoubra El-Kheima

Appendix E

Installations, time schedules, questions and SDPs

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

Memo

To: Dr Mohamed ElZarka
Copy: Jan Hassing, M Nasar, L Marsteen, Ulla Lund, Sherif Hassan
From Bjarne Sivertsen
Date: 3 November 1997

Installation time schedule for air quality monitors

Referring to our discussions concerning installations of the air pollution monitors in the Reference Laboratory at NIS, we have had discussions and evaluations with all participants in the Air Quality Monitoring component, plus meeting with Mr Ali Hamed at CTS, to find the fastest possible way of managing the installations at the Reference Laboratory.

Already at the formal opening of the Air Quality Monitoring station by the Minister of Environmental Affairs at Tabbin, the progress of the installations were 20 days delayed compared to a time schedule indicated in a meeting at Dr ElZarka's office on 8 October 1997. (Minute of meeting by: M Fathy). Leif Marsteen was not present in the meeting, but had clearly indicated that the time schedule was unrealistic.

As of 3 November 1997 the installations are further delayed due to malfunctions in instruments and in computers. All instruments are installed at the Monitoring Laboratory but all instruments have not been calibrated as the gas bottles have not been moved from Tabbin to Cairo University. CTS personnel (Ali Hamed) has been working on other projects during the last week, and Amr ElSoueini has been abroad. Thus no work has been undertaken to finalise the Monitoring Laboratory during the last week.

The present time schedule is thus the following:

- Finalise calibration at MonLab (HC, NOx, CO) — 5 - 6 Nov 1997
  (assuming that reference gases are released from Tabbin before 5 Nov)
- Cairo University Station installed — 9 - 11 Nov 1997
- AirCondition at Cairo Univ will be installed — after 11 Nov.
- Software error in Computer centre checked by EMC specialist — 12 Nov 1997
- Computers transferred to Cairo University — 16 Nov 1997
- Installations at Monitor Lab (Computer Center) — 17- 20 Nov 1997
- Test installation of Gomoroya station at Tabbin — 16 22 Nov 1997
  (this has to be undertaken when ref gases and calibrator is at Tabbin)
- Installations at Reference Laboratory start — 23 Nov 1997
  (these installations will last at least 2 weeks)
- Installation of the Gemoroya station should start on — 7 December 1997

It is requested from CTS experts that all time schedules; planning, modifications and changes are handled via the air pollution monitoring Task Manager.

4Nov97: Discussed and approved by Dr. ElZarka

The time schedule for the tasks is shown below.

Task	Activity period	Training period	Trained Inst.	Comment
C.2.2. Prepare instruments for installation	14 Sep. -			Done by CTS in 1997
D.1.2. Specify data retrieval and local database at Monitoring Laboratory	20 Oct. -	11 Oct. - 20 Oct. 16 Nov. - 20 Nov.	Mon.Lab. Mon.Lab.	Trained by CTS Trained by EIMP
D.1.3. Specify data quality check and control procedures	22 Sep. -	21 Oct. - 26 Oct. 9 Nov. - 13 Nov.	Mon.Lab. Ref.Lab.	Trained by EIMP Trained by EIMP
D.2.2. Establish local database for monitoring data at Monitoring Laboratory	11 Oct. - 20 Oct.	11 Oct. - 20 Oct. 16 Nov. - 20 Nov.	Mon.Lab. Mon.Lab.	Done/trained by CTS Trained by EIMP
E.2.1. Prepare on-the-job training programme	12 Oct. -			
E.2.2. Prepare training programme for instrument operation and maintenance	12 Oct. -			
E.2.3. On-the-job training at Reference Laboratory and Monitoring Laboratory		11 Oct. - 20 Oct. 21. Oct. - 26 Oct. 16 Nov. - 20 Nov. 21 Oct. - 3 Nov. 9 Nov. - 13 Nov. 23 Nov. - 25 Nov.	Mon. Lab. Mon. Lab. Mon. Lab. Ref.Lab. Ref.Lab. Ref.Lab.	Trained by CTS Trained by EIMP Trained by EIMP Trained by CTS Trained by EIMP Trained by EIMP
E.2.4. Support training at Reference Laboratory		9 Nov. - 13 Nov. 23 Nov. - 25 Nov.	Ref.Lab. Ref.Lab.	Trained by EIMP Trained by EIMP
F.2.1. Specify instrument calibration procedures/ SOPs	2 Sep. - 21 Oct. 26 Nov. -			
F.2.2. Design QA/ QC procedures at Monitoring Laboratory	2 Sep. - 21 Oct. 26 Nov. -			
F.2.3. Establish standard operational procedures as part of on-the-job training	2 Sep. - 21 Oct. 26 Nov. -			
G.2.3. Start monitoring programme and data retrieval	8 Oct. 20 Oct.			Tebbin Station Comp. Centre
G.3.2. Establish first monitors in Cairo and Alexandria	8 Oct.			Tebbin Station
G.4.1. Data retrieval and data evaluation	20 Oct.	16 Nov. - 20 Nov.	Mon.Lab.	From Tebbin st. Trained by EIMP
H.1.1. Installation of monitors at Reference Laboratory	21 Oct. - 3 Nov.	21 Oct. - 3 Nov.	Ref.Lab.	Done/trained by CTS
H.1.2. Calibration of monitors installed	21 Oct. - 3 Nov.	21 Oct. - 3 Nov. 9 Nov. - 13 Nov. 23 Nov. - 25 Nov.	Ref.Lab. Ref.Lab. Ref.Lab.	Done/trained by CTS Trained by EIMP Trained by EIMP
H.2.1. Train Reference Laboratory personnel in use of monitors and calibration		21 Oct. - 3 Nov. 9 Nov. - 13 Nov. 23 Nov. - 25 Nov.	Ref.Lab. Ref.Lab. Ref.Lab.	Trained by CTS Trained by EIMP Trained by EIMP

Installation schedule

Preparation | Installation | M Monitor | S Summary sequential sampler | P Passive sampler | C Computer

Year:	97																																																		
Month:	1	1	1	1	2	2	2	2	3	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	6	7	7	7	7	8	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	11	12	12	12	12
Date (Sunday):	5	12	19	26	2	9	16	23	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28
Week:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Computer center																																														C						
Monitoring Laboratory																																					M						M	■								
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Monitoring Laboratory, Cal. lab.																																																				
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Cairo City Center																																																				
El Gemhoroya street																																																	M	■	■	■
Meteorological Institute																																																				
Nasr City																																																				
Maadi Police Station																																																				
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El Azafra El Azhar Univ.																																																				
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Tanta																																																				
El Mahalla El Kubra																																																				
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Domyat																																																				

Summary

Installation schedule

Year:	98																																																			
Month:	1	1	1	1	2	2	2	2	3	3	3	3	3	4	4	4	4	5	5	5	5	5	6	6	6	6	7	7	7	7	8	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	11	12	12	12	12
Date (Sunday):	4	11	18	25	1	8	15	22	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	20	27
Week:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Computer center																																																				
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Maadi Police Station																	M																																			
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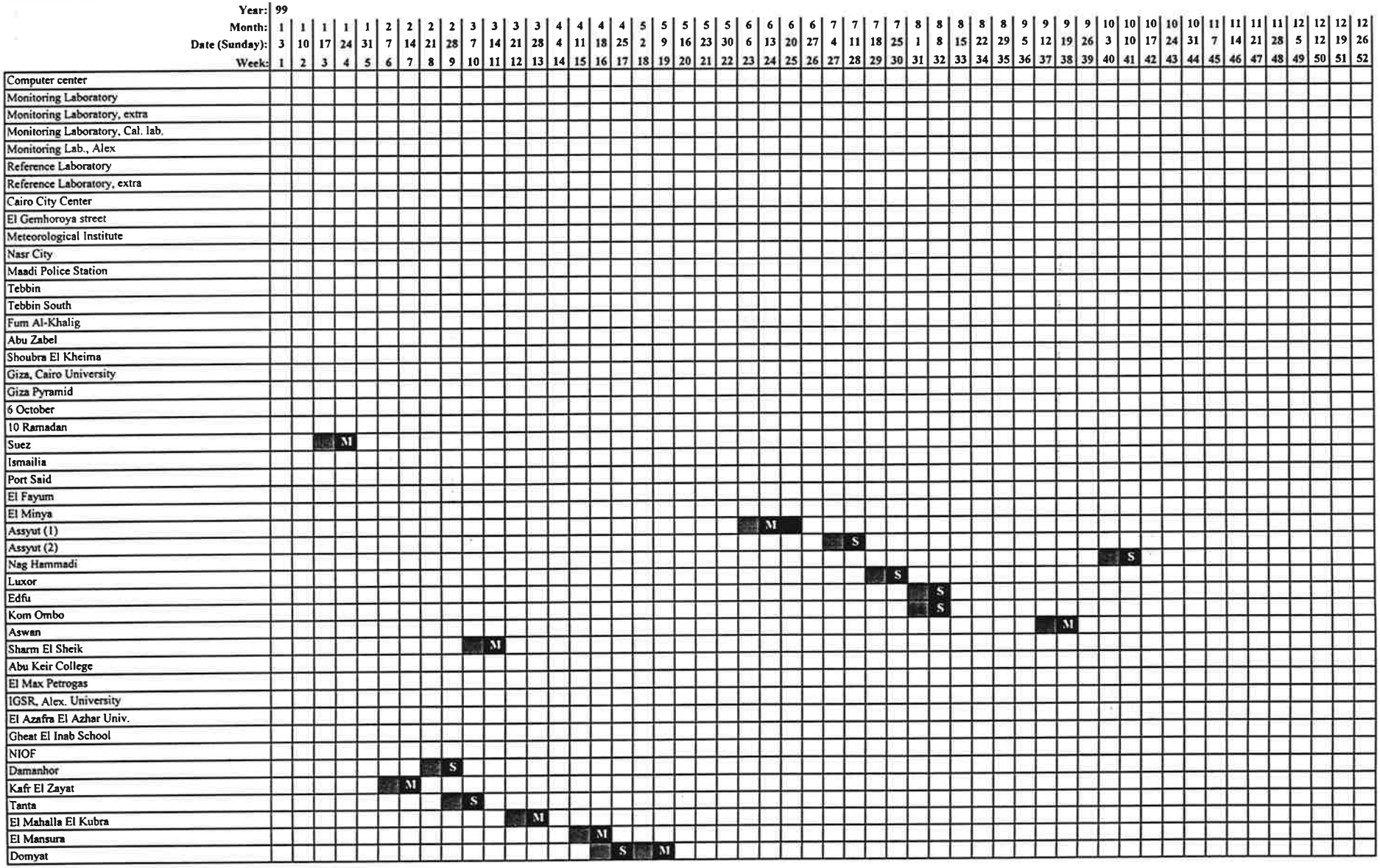
El Mahalla El Kubra																																																				
El Mansura																																																				
Domyat																																																				

Installation schedule

Summary



CHEMICAL & TECHNICAL SERVICES
شركة الخدمات الفنية والكيميائية

To: Eng. Mohamed Fathy
EIMP

Date: Oct.,12 th 1997.

Subject: Installation Schedule in accordance with the agreement dated October 5th, 1997.

Dear Eng. Fathy

Re a/m subject, we would like to advise you with the details for the installation of the Monitoring station at TIMS;

- EIMP did not provide for the erection and earthling of the masts of stationary Met Stations. Dr. Nassar and Mr. Marsteen decided to install the Met tower on the roof with two sections of the tower with a total height of approx. 6 meters. They also decided to bore a hole in the ceiling and fix the bases for the Guy wire. In order to complete our task, we made these holes and altered the installation accessories delivered from Kontram to meet the alterations decided by Dr. Nassar and Mr. Marsteen. Also, CTS took care of the Cement finish of the roof after fixing the bases for the Guys.

  In addition the sensor cables were not delivered to suite the installation on the roof and the sensors to be that far from the Weather Station Translator. CTS has purchased a junction box and necessary cables to meet the altered location.

  The tower is not earthed and not protected against Lightening. In case of Lightening, this could damage the sensors, translator and Data Acquisition Board.

- The Beta Guage is delivered with a 120 cm. aluminium intake tube suitable for installation in an environmental shelter, also this was altered and a 3 meters aluminium intake tube is required. We purchased the aluminium tubes but unfortunately the size can not be matched locally. Since this is not in the scope of installation, you are kindly requested to make available these tubes for those Beta Guages that will not be installed in Shelters.

٤ شارع معمل السكر جاردن سيتي – القاهرة / ت : ٣٥٥٢٥٦٠ / س . ت : ٢٧٤٣ / فاكس : ٣٥٥١٣٥٦
ADDRESS : 4, MAAMAL EL SOKKAR ST., GARDEN CITY, CAIRO / TEL. : 3552560 / RCC. : 2743 / FAX. : 3551356

- The airconditioning was only installed on Saturday 11th, October 1997. We had to take out the rack with the analyzers and the computer from the room to allow for the installation of the air conditioning.

- Due to the above tasks and supplies not included in the installation contract there was a delay in the completion of the installation at TIMS untill Sunday 12th, October 1997, and the installation at Cairo Univ. will be then start on Monday 13th, October 1997, given the fact that the remaining components will be ready at Cairo University on that date.

Best Regards

Dr. Amr El-Soueni

EIMP

Chemical and Technical Services
Amr El-Soueni
4 Maamal El-Sokkar St.
Garden City, Cairo

Kontram APS
Jarmo Kiukainen
Meterbuen 6-12
DK-2740 Skovlunde
Denmark

Environmental Information
and Monitoring Programme

EEAA - Danida - COWI

30 Misr-Helwan Street
Maadi, Cairo, Egypt

Tel.: (+202) 351 0970
Fax: +202 378 5478

E-mail: eimp@intouch.com

Various questions regarding instrumentation and installations

Date
8 Nov 1997
Our ref.
Leif Marsteen

The installations provided by Kontram/ CTS have been going on for 2 months. So far the Tebbin station and the Monitoring laboratory have been installed. Still one station, the Reference laboratory and the Computer center and all training and instructions in Arabic remains. CTS has co-operated very well although the installations have taken longer time then we expected.

We would like to summarise the major problems and questions that have surfaced during the installations so far and kindly ask Kontram/ CTS to provide us with information on the subjects.

At stations with only one monitor Kontram recommended not to use the conventional air intake and manifold. What kind of air intake do Kontram recommend to use at single monitor stations?

We would like CTS to provide us with a complete list of items (fittings, nuts, wires, etc.) which were not included in the delivery but are necessary to complete the installation of a station.

The supplied PM10 intakes are approx. 1.5 m. This is too short for some of our installations. According to CTS the maximum length is 12 feet. We would like Kontram to provide us with information on the price of such an intake and whether it is possible to return and get a refund on air intakes which are too short.

The PM10 monitor at Tebbin stops at random. Sometimes it has stopped because of power failure but on other occasions no power failure has been recorded. The monitor is unable to start again after an uncontrolled stop and must be reprogrammed and started manually. We would like Kontram to comment on this and CTS to investigate the problem.

For the operation of TEI 145 permeation calibrator Kontram has specified only two solenoid valves at the air intake manifold, one for zero air and one for span gas. There is no solenoid valve for shutting off ambient air during

zero/ span checks. According to Harri Granath of Kontram Finland which visited CTS in October this year the TEI 145 permeation calibrator has pressureless zero and span outputs resulting in a mix of calibration air and ambient air at the air intake manifold during zero/ span checks making the check worthless. This has also been observed. We would like Kontram to solve this problem and to provide us with a list showing the correct air intake solenoid valve combination for all installations.

The supplied electrical wires for the meteorological towers are too short for some of our installations. We would like Kontram to provide us with information on the maximum possible length of the wires including prices and whether it is possible to return and get a refund on wires which are too short.

At Tebbin CTS has terminated the electrical wires at the meteorological tower and extended the wires using not original wires. Is this OK or will it introduce distortion or other problems.? Is it possible to extend the wires using original extension wires?

In the bid from Kontram two cables are specified for the relative humidity sensor, one of 12 m length and one of 3 m length. Why? There is only one relative humidity sensor for each tower.

The delivered meteorological towers are not foldable. We would like Kontram to provide us with information on the possibility of making them foldable including prices and whether it is possible to return and get a refund on (remaining parts of) the towers that are not necessary after a rebuild.

According to Harri Granath of Kontram Finland the N2 carrier gas cylinder regulator has a specified maximum inlet pressure of 40 Bar. This is stamped on the regulator. However the N2 gas cylinder has a pressure of over 100 Bar. Furthermore the regulator does not have standard swagelok output connection but rather a connection suitable for connecting to a hose although neither a Teflon tube nor a flexible silicon tube can be used. It seems that the delivered regulator is not suitable for the purpose. Can Kontram comment on this?

We would like Kontram to specify which accessories if any were delivered with the PM10 and TSP high volume samplers. We received no filters for getting started.

Best regards,

Leif Marsteen

Quality Handbook		EIMP
Standard Operations Procedures Manual	Page :	Page 2 of 4
	Date :	97.06.01
Monitoring Lab	Issue No :	001

CONTENTS

Quality Handbook		**EIMP**
Standard Operations Procedures Manual	Page :	Page 3 of 4
	Date :	97.06.01
Monitoring Lab	Issue No :	001

Routine maintenance on a TEI model 145 PT Z/S check unit		
Routine maintenance on a TEI model 610 TSP high volume sampler	**x**	**x**
Installing a TEI model 146 multipoint calibrator		
Installing a TEI model 49CPS O_3 calibrator		
Installing an air intake and manifold		
Installing a TEI model 43C SO_2 monitor		
Installing a TEI model 42C NO_x monitor		
Installing a TEI model 48C CO monitor		
Installing a TEI model 55C HC monitor		
Installing a TEI model 49C O_3 monitor		
Installing a reference standard gas cylinder	**x**	**0**
Installing a Travelling or working standard gas cylinder	**x**	**0**
Installing a TEI model 1150 zero air generator		
Installing a TEI model 102S-2 gas cylinder Z/S check unit		
Installing a TEI model 145 PT Z/S check unit		
Installing a EMC Station Manager data logger		
Packing list - Air intake and manifold		
Packing list - TEI model 43C SO_2 monitor		
Packing list - TEI model 42C NO_x monitor		
Packing list - TEI model 48C CO monitor		
Packing list - TEI model 55C HC monitor		
Packing list - TEI model 49C O_3 monitor		
Packing list - TEI model 102S-2 gas cylinder Z/S check unit		
Packing list - TEI model 145 PT Z/S check unit		
Packing list - EMC Station Manager data logger		

S = Finalised SOP, F = Finalised Form

Appendix F

Air Pollution Monitoring, Inventory, Procurement and Spareparts. Inventory list: Addendum, separate report

Inventory List

Comment: Summary

Items	Model	Procured Shipment 0	1	1a	Uni./ Met.	Tot. proc.	Plan	Sh. 2	Orig. Sh. 2	Comments
SO2 monitor	TEI 43C		10		1	11	19	8	8	
NOx monitor	TEI 42C		11		1	12	15	3	3	
PM10 monitor	TEI 650PM10	9				9	8	-1		Can not be returned
O3 monitor	TEI 49C		3		2	5	8	3	4	
CO monitor	TEI 48C		5			5	5			No backup
NMHC monitor	TEI 55C		5			5	5			No backup
Z/S unit, perm., NOx/NOx+SO2	TEI 145		10			10	12	2	3	
Span unit, perm. , SO2	TEI 43C-400		5			5	5		3	
Z/S unit, gas, CO/HC	TEI 102S-2		4			4	3	-1		No backup
Zero air generator, CO/HC	TEI 1150		5		1	6	6			No backup
Zero air gen. compressor, CO/HC			5		1	6	6			Incl. in Zero air gen.
Zero air generator, NOx/SO2	Purafil+Charcoal		11			11	14	3	3	
Zero air generator, SO2	Charcoal		5			5	5		2	
Zero air gen. pump, NOx/SO2										
SO2 cal. gas, 0.8 ppm, trav. std.			1			1	6	5		
NO cal. gas, 0.8 ppm, trav. std.			1			1	6	5		1 Wrong conc. dlv.
CO cal. gas, 50 ppm, trav. std.			1			1	3	2		
HC cal. gas, 2 ppm, trav. std.			1			1	3	2		
SO2 cal. gas, 0.8 ppm, wrk. std.										
NO cal. gas, 0.8 ppm, wrk. std.										
CO cal. gas, 50 ppm, wrk. std.										
HC cal. gas, 2 ppm, wrk. std.										
CO zero. gas, wrk. std.										
CO span gas, 500 ppm, wrk. std			4			4	3	-1		
HC span gas, 20 ppm, wrk. std.			4			4	3	-1		
N2 carrier NMHC			5			5	4	-1		Can not be returned
H2 generator NMHC			5			5	5			Included in HC mon.
SO2 perm. tubes, TEI 43C-400	177-005-0082		5			5	4	-1	2	
SO2 perm. tubes, TEI 145	177-008-0082-T33		5			5	11	6	5	
NO2 perm. tubes, TEI 145	177-007-0081		10			10	11	1	3	1 ekstra needed
Air intake, simple							4	4		
Air intake			11		1	12	14	2	3	
Air intake manifold, 5 solenoids			2			2	3	1		
Air intake manifold, 4 solenoids			1			1	2	1	1	
Air intake manifold, 3 solenoids			3			3		-3		
Air intake manifold, 2 solenoids			5			5	9	4	3	
Met Wind Speed	MO 014-A-1	7				7	7			
Met Wind Direction	MO 024-A	7				7	7			
Met Rel. Hum.	MO 083C-0-35	7				7	7			
Met Radiation Shield	p/n 5980	7				7	7			
Met diff. temp.	MO 062	14				14	14			
Met radiation shield	MO 076B-12	14				14	14			
Met Solar Radiation	MO 097	7				7	7			
Met Translator	MO 131	7				7	7			
Met Mast	p/n 970664	7			1	8	8			
Met Solar Panel	p/n 270									
Met Radio link										
Met Relative humidity calibrator	510070						1	1		
Shelter data acq., PC	GW P5-133		12			12	20	8	12	
Shelter data acq., Monitor			12			12	20	8	12	
Shelter data acq., Modem			12			12	20	8	12	
Shelter data acq., Software	EMC St.Man.		12			12	20	8	12	
Shelter data acq., Software 2	MS Office 95		12			12	20	8	12	
Shelter data acq., Hardware	EMC		12			12	20	8	12	
Seq. air sampler, SO2	NILU FK1-SO2						13	13		
Seq. air sampler, NO2	NILU FK1-NO2						7	7		
PM10 HiVol	TEI 610		4			4	9	5	6	Can not be returned
TSP HiVol	TEI 600		2			2	5	3	3	
Calibration orifice kit	p/nAWAAXXX8			3		3	3			
VOC sampler							6	6		Not from Kontram
Passive sampler							25	25		
Two filter sampler							12	12		
Rack for monitors	EDR20086		15			15	16	1	9	

Inventory List

Comment: Summary

Items	Model	Procured Shipment 0	1	1a	Uni./ Met.	Tot. proc.	Plan	Sh. 2	Orig. Sh. 2	Comments
Dust fall	NILU SFI						22	22		
Shelter, small							7	7		
Shelter, large							7	7		
Port. Met., Wind Speed+Direction	MO 034	1				1	1			
Port. Met., Rel. Hum.+Temp.	MO 083C-1-35	1				1	1			
Port. Met., Radiation Shield	p/n 5980	1				1	1			
Port. Met., Solar Radiation	MO 097	1				1	1			
Port. Met., Data logger	MO 466A	1				1	1			
Port. Met., Mast	p/n 908	1				1	1			
Lab. env., Rel. Hum.+Temp.	Va HMP 231	1				1	2	1		
Lab. env., Air Pressure	Va PTB 201AD	1				1	2	1		
Lab. env., CO detector	SA 3000 SI	1				1	2	1		
Pressure calibrator	Dr DPI 601						1	1		
Multigas mulitpoint calibrator	TEI 146		1		1	2	2			
O3 calibrator	TEI 49CPS		1			1	2	1		
SO2 cal. gas, 100 ppm, ref. std.			1			1	2	1		
NO cal. gas, 100 ppm, ref. std.			1			1	2	1		
CO cal. gas, 5000 ppm, ref. std.			1			1	2	1		
HC cal. gas, 200 ppm, ref. std.			1			1	2	1		
Sample filter, teflon			9			9	9			
Wet gas meter 3 l/min	Ri TG3						1	1		
Wet gas meter 20 l/min	Ri TG20						1	1		
Repair tools		8				8	7	-1		Can not be returned
Laboratory items			2			2	2			1/2 of Reflab to Alex
Ref. lab, PC	GW P5-133									Incl. in Shelter PC
Ref. lab, software	MS Office 95									Incl. in Shelter PC
Ref. lab, printer	HP 682C DJ		1			1	2	1		
Car, Mitsubishi Pajero GL			1			1	1		1	
Motor scooter, Yamaha YB100			6			6	6		6	
Balance			1			1	1		1	
Computer for balance							1	1		
Ion Cromatograph										
Comp. center data acq., PC	GW P5-166		1			1	1			
Comp. center data acq., monitor			1			1	1			
Comp. center data acq., modem			1			1	1			
Comp. center data acq., software	EMC Sys.Man.		1			1	1			
Comp. center, software	MS Office 95		1			1	1			
Comp. center printer no. 1	HP 682C DJ		1			1	1			
Comp. center, PC	GW P5-166		1			1	1			
Comp. center, monitor			1			1	1			
Comp. center, software	MS Office 95		1			1	1			
Comp. center printer no. 2	HP LJ 5P		1			1	1			

Total institutional costs

Comment: Only EIMP instruments including shelters. Spareparts not included

Id	Station	UnitSum	Institution
1	CompCenter	100,000.-	C
2	MonLab	690,322.-	C
3	MonLabXtra	69,920.-	C
4	MonLabCal	416,341.-	C
5	MonLabAlx	89,822.-	A
6	RefLab	671,814.-	N
7	RefLabXtra	40,360.-	N
8	CairoCenter	350,432.-	C
9	ElGemhStr	489,763.-	C
10	MetInst	183,704.-	C
11	NasrCity	75,060.-	C
12	MaadiPol	291,507.-	C
13	Tebbin	394,598.-	C
14	TebbinS	64,967.-	C
15	FumAlKhalig	488,569.-	C
16	AbuZabel	2,456.-	C
17	Shoubra	226,806.-	C
18	GizaUniv	39,130.-	C
19	GizaPyramid	400.-	C
20	6October	75,060.-	C
21	10Ramadan	58,674.-	C
22	Suez	270,918.-	C
23	Ismailia	4,400.-	C
24	PortSaid	4,400.-	C
25	ElFayum	2,456.-	C
26	ElMinya	6,456.-	C
27	Assyut1	329,472.-	C
28	Assyut2	2,456.-	C
29	NagHammadi	6,056.-	C
30	Luxor	21,298.-	C
31	Edfu	21,298.-	C
32	KomOmbo	4,400.-	C
33	Aswan	236,530.-	C
34	Sharm	116,168.-	C
35	AbuKeir	264,725.-	A
36	ElMax	93,616.-	A
37	IGSR	590,873.-	A
38	ElAzafra	55,684.-	A
39	Gheat	89,060.-	A
40	NIOF	109,912.-	A
41	Damanhor	39,098.-	A
42	KafrElZayet	322,419.-	A
43	Tanta	22,842.-	A
44	ElMahalla	215,464.-	A
45	ElMansura	243,849.-	A
46	Domyat	178,026.-	A

Total institutions:

NIS:	712,174.-	
Cairo University:	5,044,017.-	
Alexandria Unversity:	2,315,390.-	
Not allocated:	261,094.-	See Procurement plan
Total Dkk:	8,332,675.-	

C = Cairo University
A = Alexandria University
N = NIS

Total instrument costs

Comment: Only EIMP instruments
Spareparts not included

Items	Model	CIF Unit	Plan Units	Plan Total	Not allocated Units	Not allocated Total	Sales repr./ comments
SO2 monitor	TEI 43C	48,220.-	18	867,960.-			Kontram
NOx monitor	TEI 42C	59,110.-	14	827,540.-			Kontram
PM10 monitor	TEI 650PM10	79,070.-	8	632,560.-	1	79,070.-	Kontram
O3 monitor	TEI 49C	50,570.-	6	303,420.-			Kontram
CO monitor	TEI 48C	41,610.-	5	208,050.-			Kontram
NMHC monitor	TEI 55C	103,560.-	5	517,800.-			Kontram
Z/S unit, perm., NOx/NOx+SO2	TEI 145	22,180.-	12	266,160.-			Kontram
Span unit, perm. , SO2	TEI 43C-400	10,420.-	5	52,100.-			Kontram, inside monitor
Z/S unit, gas, CO/HC	TEI 102S-2	21,150.-	3	63,450.-	1	21,150.-	Kontram, use as backup
Zero air generator, CO/HC	TEI 1150	26,690.-	5	133,450.-			Kontram, no backup
Zero air gen. compressor, CO/HC			5				Kontram, cost incl. in Z g.
Zero air generator, NOx/SO2	Purafil+Charcoal		14				Kontram, cost incl. in Z u.
Zero air generator, SO2	Charcoal		5				Incl. in monitor
SO2 cal. gas, 0.8 ppm, trav. std.		14,370.-	6	86,220.-			Kontram, not > 10 litre
NO cal. gas, 0.8 ppm, trav. std.		12,280.-	6	73,680.-			Kontram, not > 10 litre
CO cal. gas, 50 ppm, trav. std.		6,590.-	3	19,770.-			Kontram, not > 10 litre
HC cal. gas, 2 ppm, trav. std.		7,120.-	3	21,360.-			Kontram, not > 10 litre
CO span gas, 500 ppm, wrk. std		6,860.-	3	20,580.-	1	6,860.-	Kontram
HC span gas, 20 ppm, wrk. std.		7,130.-	3	21,390.-	1	7,130.-	Kontram
N2 carrier NMHC		2,900.-	4	11,600.-	1	2,900.-	Kontram
H2 generator NMHC			5				Kontram, cost incl. HC m.
SO2 perm. tubes, TEI 43C-400	177-005-0082	2,356.-	4	9,424.-	1	2,356.-	Kontram
SO2 perm. tubes, TEI 145	177-008-0082-T33	2,356.-	11	25,916.-			Kontram
NO2 perm. tubes, TEI 145	177-007-0081	2,473.-	11	27,203.-			Kontram
Air intake, simple		200.-	8	1,600.-	-8		Made local
Air intake		29,056.-	11	319,616.-			Kontram, estimate
Air intake manifold, 5 solenoids			2				Kontram
Air intake manifold, 4 solenoids			2		-1		Kontram, will be construc.
Air intake manifold, 2 solenoids			7		-2		Kontram, will be construc.
Met Wind Speed	MO 014-A-1		7				Kontram
Met Wind Direction	MO 024-A		7				Kontram
Met Rel. Hum.	MO 083C-0-35		7				Kontram
Met Radiation Shield	5980		7				Kontram
Met diff. temp.	MO 062		14				Kontram
Met Temp. radiation shield	MO 076B-12		14				Kontram
Met Solar Radiation	MO 097		7				Kontram
Met Translator	MO 131		7				Kontram
Met Mast	970664	60,610.-	7	424,270.-			Kontram, cost incl. sens.
Met Relative humidity calibrator	510070	2,948.-	1	2,948.-			Kontram
Shelter data acq., PC	GW P5-133	59,142.-	20	1,182,840.-			Kontram, estimate
Shelter data acq., Monitor			20				Kontram, cost incl. in PC
Shelter data acq., Modem			20				Kontram, cost incl. in PC
Shelter data acq., Software	EMC St.Man.		20				Kontram, cost incl. in PC
Shelter data acq., Software 2	MS Office 95		20				Kontram, cost incl. in PC
Shelter data acq., Hardware	EMC		20				Kontram, cost incl. in PC
Seq. air sampler, SO2	NILU FK1-SO2	18,842.-	13	244,946.-			NILU
Seq. air sampler, NO2	NILU FK1-NO2	18,842.-	7	131,894.-			NILU
PM10 HiVol	TEI 610	37,376.-	9	336,384.-			Kontram
TSP HiVol	TEI 600	27,569.-	5	137,845.-			Kontram
Calibration orifice kit	AWAAXXX8	6,836.-	3	20,508.-			Kontram (Spare part)
VOC sampler		2,500.-	6	15,000.-			NILU, estimate
Passive sampler		200.-	25	5,000.-			NILU, estimate
Two filter sampler		4,000.-	12	48,000.-			NILU, estimate
Rack for monitors	EDR20086	2,756.-	16	44,096.-			Eldon

Total instrument costs

Comment: Only EIMP instruments
Spareparts not included

Items	Model	CIF Unit	Plan Units	Plan Total	Not allocated Units	Not allocated Total	Sales repr./ comments
Dust fall	NILU SF1	2,056.-	22	45,232.-			NILU
Shelter, small		14,000.-	7	98,000.-			Arab Contractors
Shelter, large		16,000.-	7	112,000.-			Arab Contractors
Port. Met., Wind Speed+Direction	MO 034		1				Kontram
Port. Met., Rel. Hum.+Temp.	MO 083C-1-35		1				Kontram
Port. Met., Radiation Shield	5980		1				Kontram
Port. Met., Solar Radiation	MO 097		1				Kontram
Port. Met., Data logger	MO 466A		1				Kontram
Port. Met., Mast	908	35,720.-	1	35,720.-			Kontram, cost incl. sens.
Lab. env., Rel. Hum.+Temp.	Va HMP 231	38,305.-	2	76,610.-			Kontram, total Lab env.
Lab. env., Air Pressure	Va PTB 201AD		2				Kontram, cost incl. in RH
Lab. env., CO detector	SA 3000 SI		2				Kontram, cost incl. in RH
Pressure calibrator	Dr DPI 601	21,548.-	1	21,548.-			Druck
Multigas mulitpoint calibrator	TEI 146	54,810.-	1	54,810.-			Kontram
O3 calibrator	TEI 49CPS	45,810.-	2	91,620.-			Kontram
SO2 cal. gas, 100 ppm, ref. std.		11,270.-	2	22,540.-			Kontram, 10 litre or less
NO cal. gas, 100 ppm, ref. std.		11,270.-	2	22,540.-			Kontram, 10 litre or less
CO cal. gas, 5000 ppm, ref. std.		8,510.-	2	17,020.-			Kontram, 10 litre or less
HC cal. gas, 200 ppm, ref. std.		8,810.-	2	17,620.-			Kontram, 10 litre or less
Sample filter, teflon		1,310.-	9	11,790.-			Kontram
Wet gas meter 3 l/min	Ri TG3	20,438.-	1	20,438.-			Ritter
Wet gas meter 20 l/min	Ri TG20	25,192.-	1	25,192.-			Ritter
Repair tools		5,278.-	7	36,946.-	1	5,278.-	Kontram
Laboratory items		23,395.-	2	46,790.-			Kontram
Ref. lab, printer	HP 682C DJ		1				Kontram, cost incl. d. acq.
Motor scooter, Yamaha YB100		8,850.-	6	53,100.-			Bukkehave
Balance		42,485.-	1	42,485.-			Mettler
Computer for balance		15,000.-	1	15,000.-			Buy local
Comp. center data acq., PC	GW P5-166	100,000.-	1	100,000.-			Kontram
Comp. center data acq., monitor			1				Kontram, cost incl. d. acq.
Comp. center data acq., modem			1				Kontram, cost incl. d. acq.
Comp. center data acq., software	EMC Sys.Man.		1				Kontram, cost incl. d. acq.
Comp. center, software	MS Office 95		1				Kontram, cost incl. d. acq.
Comp. center, PC	GW P5-166		1				Kontram, cost incl. d. acq.
Comp. center, monitor			1				Kontram, cost incl. d. acq.
Comp. center, software	MS Office 95		1				Kontram, cost incl. d. acq.
Comp. center printer no. 2	HP LJ 5P		1		1		Kontram, cost incl. d. acq.
		Total Dkk:		8,071,581.-		261,094.-	

EIMP

Note

Subject: Computer resources at the Monitoring institutions

Date: 26 Nov 1997

To: Jan Hassing

Copy: MF

From: LM, BS, MN

Environmental Information and Monitoring Programme

EEAA - Danida - COWI

30 Misr-Helwan Street
Maadi, Cairo, Egypt

Tel.: (+202) 351 0970
Fax: +202 378 5478

E-mail: eimp@intouch.com

The specifications for the computer resources for the ambient air component was made before the monitoring institutions were selected. To cover the possibility of limited computer resources at the monitoring institutions all necessary computers, printers e.t.c. were included in the specifications.

Original specifications

Calibration and maintenance lab at Monitoring Laboratory:

- No PC and printer was specified since the Monitoring Laboratory originally was not supposed to do calibrations.

Computer centre at Monitoring Laboratory:

- PC for collecting data automatically from all stations
- Ink jet printer connected to data collecting PC for routine printouts
- PC for processing data
- Laser jet printer connected to data processing PC for report printouts

The ink jet printer at the Computer centre was later changed to a laser jet printer by EIMP.

Reference Laboratory:

- PC for processing calibration data
- Ink jet printer for calibration report printouts

Adjustments to original plan

Calibration and maintenance lab at Monitoring Laboratory:

The Monitoring Laboratory is going to do calibrations and a PC is necessary in the lab for processing calibration data. The Monitoring Laboratory is equipped with a data logger which is PC based. This PC can also be used for processing

calibration results. By connecting the PC to the data network any network printer can be accessed for making calibration report printouts.

Computer centre at Monitoring Laboratory:

The data collecting PC at the Computer centre have a dedicated printer for uninterrupted operation. A large number of PCs are available at the nearby Computer lab. The second PC will thus not be necessary. A new monitoring institution has been established in Alexandria. We recommend that the second PC will be transferred to the Monitoring Laboratory in Alexandria for air quality data processing. The second PC has a preinstalled backup of the data collecting software System Manager. This is not a second licence and was only intended for use in case of breakdown in the data collecting PC. This software have do be deleted. We already have software backup on floppy. The second printer at the computer center is needed at the EIMP air monitoring component office and will be transfered to the office as soon as possible.

Reference Laboratory:

The Reference Laboratory is equipped as planned and necessary.

Monitoring Laboratory, Alexandria:

The Monitoring Laboratory in Alexandria should have a PC and software for displaying data downloaded from the Computer centre in Cairo University. This computer can be the second Computer centre PC.

New computer resources plan

Calibration and maintenance lab at Monitoring Laboratory:

- The data logger PC will be used for calculating calibration results.
- An existing network printer will be used for printouts.
- The PC must have a network connection (NEW).

Computer centre at Monitoring Laboratory:

- PC for collecting data automatically from all stations
- Laser jet printer connected to data processing PC for report printouts

Reference Laboratory:

- PC for processing calibration data
- Ink jet printer for calibration report printouts

Monitoring Laboratory, Alexandria:

- PC for displaying data downloaded from the Computer centre at Cairo University
- Software for displaying the data
- Network connection (NEW).

EIMP Air monitoring component office:

- Laser jet printer connected to the network

EIMP

Environmental Information
and Monitoring Programme

EEAA - Danida - COWI

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COWI
Shiraz A. Dahr
Parallelvej 15
2800 Lyngby
Denmark

Date
13 Nov 1997
Our ref.
Leif Marsteen

Procurement Ambient air quality instrumentation and spareparts

Dear Shiraz

I am sending you the specifications for procuring the remaining air quality instrumentation as well as spareparts and consumables.

The document called **Shipment2.XLS** contains the specifications for procuring all remaining equipment. You will not receive any technical evaluation of the sequential samplers and dust fall samplers since according to Anwar Ahmed this has already been done by COWI. I have assumed that NILU is the selected supplier. VOC sampler, passive sampler and two filter sampler will be procured later as we have no specifications and prices yet. The prices for these instruments are only estimates.

The document called **consumables and spareparts.XLS** contains the specifications for all spareparts and consumables for all instruments. The document is spilt into 6 sheets, one sheet for each group and one sheet for accessories. For each instrument in every group the number of spareparts and consumables as suggested by the supplier is listed. The **Tot. 2 yr** column specifies the number of items that should be procured. This is an estimated number of spare parts for the next two years. During this period we will gain experience and learn what the actual need for spareparts and consumables is. Most of the accessories listed in the **Accessories** sheet will be procured locally. Since the length of the meteorology cables must be specified they can not be procured until after the sites have been specified in detail

You should include in the procurement the following accessories:

1.		Teflon tape	7 pcs
2.	MMF-1 S40F	Mini Masterflowmeter	20 pcs
3.	CWH306	Azlon Y connector 6 mm PP	20 pcs

The suppliers are the following:

1. Probably Kontram

2. Dwyer Instruments, Inc.
   P.O. Box 373
   Michigan city
   Indiana 46360
   USA

3. Bibby Sterilin Ltd.
   Stone, Staffs.
   ST 15 OSA
   England

Best regards,

Leif Marsteen

Procurement plan

Comment:

Station inventory - overview

Items	Model	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SO2 monitor	TEI 43C		1		1		1		1	1	1		1	1		1		1	1				1	
NOx monitor	TEI 42C		1		1		1		1	1			1	1		1			1				1	
PM10 monitor	TEI 650PM10		1						1				1	1				1						
O3 monitor	TEI 49C		1				1			1	1								1					
CO monitor	TEI 48C				1		1			1						1								
NMHC monitor	TEI 55C				1		1			1						1								
Z/S unit, perm., NOx/NOx+SO2	TEI 145		1						1	1			1	1		1							1	
Span unit, perm. , SO2	TEI 43C-400				1						1							1						
Z/S unit, gas, CO/HC	TEI 102S-2									1						1								
Zero air generator, CO/HC	TEI 1150				1		1			1						1			1					
Zero air gen. compressor, CO/HC					1		1			1						1			1					
Zero air generator, NOx/SO2	Purafil+Charcoal		1		1		1		1	1			1	1		1							1	
Zero air generator, SO2	Charcoal				1						1							1						
Zero air gen. pump, NOx/SO2																								
SO2 cal. gas, 0.8 ppm, trav. std.				2		2		1											1					
NO cal. gas, 0.8 ppm, trav. std.				2		1		1											2					
CO cal. gas, 50 ppm, trav. std.			1			1		1																
HC cal. gas, 2 ppm, trav. std.			1			1		1																
SO2 cal. gas, 0.8 ppm, wrk. std.																								
NO cal. gas, 0.8 ppm, wrk. std.																								
CO cal. gas, 50 ppm, wrk. std.																								
HC cal. gas, 2 ppm, wrk. std.																								
CO zero. gas, wrk. std.																								
CO span gas, 500 ppm, wrk. std										1						1								
HC span gas, 20 ppm, wrk. std.										1						1								
N2 carrier NMHC						1				1						1								
H2 generator NMHC					1		1			1						1								
SO2 perm. tubes, TEI 43C-400	177-005-0082										1							1						
SO2 perm. tubes, TEI 145	177-008-0082-T33								1	1			1	1		1							1	
NO2 perm. tubes, TEI 145	177-007-0081								1	1			1	1		1							1	
Air intake, simple																								
Air intake			1						1	1				1		1			1				1	
Air intake manifold, 5 solenoids			1							1														
Air intake manifold, 4 solenoids																1								
Air intake manifold, 3 solenoids																								
Air intake manifold, 2 solenoids									1					1									1	
Met Wind Speed	MO 014-A-1		1								1			1										
Met Wind Direction	MO 024-A		1								1			1										
Met Rel. Hum.	MO 083C-0-35		1								1			1										
Met Radiation Shield	5980		1								1			1										
Met diff. temp.	MO 062		2								2			2										
Met Temp. radiation shield	MO 076B-12		2								2			2										
Met Solar Radiation	MO 097		1								1			1										
Met Translator	MO 131		1								1			1										
Met Mast	970664		1								1			1					1					
Met Solar Panel	270																							
Met Radio link																								
Met Relative humidity calibrator	510070			1																				
Shelter data acq., PC	GW P5-133		1				1		1	1	1		1	1		1		1					1	
Shelter data acq., Monitor			1				1		1	1	1		1	1		1		1					1	
Shelter data acq., Modem			1				1		1	1	1		1	1		1		1					1	
Shelter data acq., Software	EMC St.Man.		1				1		1	1	1		1	1		1		1					1	
Shelter data acq., Software 2	MS Office 95		1				1		1	1	1		1	1		1		1					1	
Shelter data acq., Hardware	EMC		1				1		1	1	1		1	1		1		1					1	
Seq. air sampler, SO2	NILU FK1-SO2		1									1			1						1	1		
Seq. air sampler, NO2	NILU FK1-NO2		1									1						1			1			
PM10 HiVol	TEI 610		1									1				1					1	1		
TSP HiVol	TEI 600								1					1	1								1	
Calibration orifice kit	AWAAXXX8			2		1																		
VOC sampler			1					##	1						1			1						
Passive sampler																	2			2		2		2
Two filter sampler			1							1								1						1
Rack for monitors	EDR20086		1		1		1		1	1	1		1	1		1							1	
Dust fall	NILU SF1		1											1	1		1	1				1	1	
Shelter, small															1									

Procurement plan

Comment:

Station inventory - overview

Items	Model	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Shelter, large									1				1			1							1	
Port. Met., Wind Speed+Direction	MO 034		1																					
Port. Met., Rel. Hum.+Temp.	MO 083C-1-35		1																					
Port. Met., Radiation Shield	5980		1																					
Port. Met., Solar Radiation	MO 097		1																					
Port. Met., Data logger	MO 466A		1																					
Port. Met., Mast	908		1																					
Lab. env., Rel. Hum.+Temp.	Va HMP 231				1		1																	
Lab. env., Air Pressure	Va PTB 201AD				1		1																	
Lab. env., CO detector	SA 3000 SI				1		1																	
Pressure calibrator	Dr DPI 601						1																	
Multigas mulitpoint calibrator	TEI 146		1				1																	
O3 calibrator	TEI 49CPS				1		1																	
SO2 cal. gas, 100 ppm, ref. std.					1		1																	
NO cal. gas, 100 ppm, ref. std.					1		1																	
CO cal. gas, 5000 ppm, ref. std.					1		1																	
HC cal. gas, 200 ppm, ref. std.					1		1																	
Sample filter, teflon			7				2																	
Wet gas meter 3 l/min	Ri TG3						1																	
Wet gas meter 20 l/min	Ri TG20						1																	
Repair tools			4			2	1																	
Laboratory items			1				1																	
Ref. lab, PC	GW P5-133																							
Ref. lab, software	MS Office 95																							
Ref. lab, printer	HP 682C DJ						1																	
Car, Mitsubishi Pajero GL																								
Motor scooter, Yamaha YB100			4			2																		
Balance			1																					
Computer for balance			1																					
Ion Cromatograph																								
Comp. center data acq., PC	GW P5-166	1																						
Comp. center data acq., monitor		1																						
Comp. center data acq., modem		1																						
Comp. center data acq., software	EMC Sys.Man.	1																						
Comp. center, software	MS Office 95	1																						
Comp. center printer no. 1	HP 682C DJ																							
Comp. center, PC	GW P5-166					1																		
Comp. center, monitor						1																		
Comp. center, software	MS Office 95					1																		
Comp. center printer no. 2	HP LJ 5P	1																						

Procurement, remaining equipment

Comment:

Items	Model	Units	CIF price Unit	CIF price Total	Schedule	Comment/sales repr.
SO2 monitor	TEI 43C	8	48,220.-	385,760.-	september 1998	Kontram
NOx monitor	TEI 42C	3	59,110.-	177,330.-	september 1998	Kontram
O3 monitor	TEI 49C	3	50,570.-	151,710.-	september 1998	Kontram
Z/S unit, perm., NOx/NOx+SO2	TEI 145	2	22,180.-	44,360.-	september 1998	Kontram
SO2 cal. gas, 0.8 ppm, trav. std.		5	14,370.-	71,850.-	A.S.A.P	Kontram, not > 10 litre
NO cal. gas, 0.8 ppm, trav. std.		5	12,280.-	61,400.-	A.S.A.P	Kontram, not > 10 litre
CO cal. gas, 50 ppm, trav. std.		2	6,590.-	13,180.-	A.S.A.P	Kontram, not > 10 litre
HC cal. gas, 2 ppm, trav. std.		2	7,120.-	14,240.-	A.S.A.P	Kontram, not > 10 litre
SO2 perm. tubes, TEI 145	177-008-0082-T3	6	2,356.-	14,136.-	september 1998	Kontram
NO2 perm. tubes, TEI 145	177-007-0081	1	2,473.-	2,473.-	september 1998	Kontram
Met Relative humidity calibrator	510070	1	2,948.-	2,948.-	september 1998	Kontram
Shelter data acq.	GW P5-133	8	63,308.-	506,464.-	september 1998	Kontram, estimate
Seq. air sampler, SO2	NILU FK1-SO2	13	18,842.-	244,946.-	april 1998	NILU
Seq. air sampler, NO2	NILU FK1-NO2	7	18,842.-	131,894.-	april 1998	NILU
PM10 HiVol	TEI 610	5	37,376.-	186,880.-	september 1998	Kontram
TSP HiVol	TEI 600	3	27,569.-	82,707.-	september 1998	Kontram
VOC sampler		6	2,500.-	15,000.-	september 1998	NILU
Passive sampler		25	200.-	5,000.-	september 1998	NILU
Two filter sampler		12	4,000.-	48,000.-	september 1998	NILU
Rack for monitors	EDR20086	1	2,756.-	2,756.-	september 1998	Eldon
Dust fall	NILU SF1	22	2,056.-	45,232.-	april 1998	NILU
Shelter, small		7	14,000.-	98,000.-	On demand	Arab Contractors
Shelter, large		7	16,000.-	112,000.-	On demand	Arab Contractors
Lab. env., Rel. Hum.+Temp.	Va HMP 231	1	38,305.-	38,305.-	A.S.AP.	Kontram, total Lab env.
Lab. env., Air Pressure	Va PTB 201AD	1			A.S.AP.	Kontram, cost incl. in RH
Lab. env., CO detector	SA 3000 SI	1			A.S.AP.	Kontram, cost incl. in RH
Pressure calibrator	Dr DPI 601	1	21,548.-	21,548.-	april 1998	Druck
O3 calibrator	TEI 49CPS	1	45,810.-	45,810.-	A.S.AP.	Kontram
SO2 cal. gas, 100 ppm, ref. std.		1	11,270.-	11,270.-	A.S.AP.	Kontram, 10 litre or less
NO cal. gas, 100 ppm, ref. std.		1	11,270.-	11,270.-	A.S.AP.	Kontram, 10 litre or less
CO cal. gas, 5000 ppm, ref. std.		1	8,510.-	8,510.-	A.S.AP.	Kontram, 10 litre or less
HC cal. gas, 200 ppm, ref. std.		1	8,810.-	8,810.-	A.S.AP.	Kontram, 10 litre or less
Wet gas meter 3 l/min	Ri TG3	1	20,438.-	20,438.-	A.S.A.P.	Ritter
Wet gas meter 20 l/min	Ri TG20	1	25,192.-	25,192.-	A.S.A.P.	Ritter
Ref. lab, printer	HP 682C DJ	1			A.S.AP.	Kontram
Computer for balance		1	15,000.-	15,000.-	A.S.AP.	Buy local
			Total sum:	2,624,419.-		

Shelters will be bought locally as they are needed.

The time schedule for most of Most of Shipment 2 deliveries are as originally planned in September 1998
Various calibration equipment must be delivered As Soon As Possible as it is needed urgently

Spareparts and consumables, total

Numbers are based on 50% installation in 1998 and 100% installation in 1999
During installations only 50% of consumables as specified by kontram are used.

Monitors:	139,122.-	
High Volume samplers:	41,764.-	
Meteorology:	9,799.-	
Laboratory environment:	5,680.-	
Seq. samplers and dust fall:	91,166.-	
Accessories	40,000.-	Estimate
Total:	327,531.-	Dkk

EIMP
Environmental Information
and Monitoring Programme
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 351 0970, Fax: 202 378 5478

Memo

To: Shiraz A. Dar
Copy: Anwar Ahmed, Jan Hassing
From Leif Marsteen (Air Monitoing Expert), Bjarne Sivertsen (Team Leader Air Quality Monitoring)
Date: 30 November 1997

Second Delivery Air Pollution equipment, Modifications

Referring to your E-mail of 28 November 1997 concerning modification of the second delivery, please find below and in the attached documents a description of the exact changes and a statement explaining the background for these changes.

The total list of equipment required for further deliveries has been caused by various changes in the management of the Air Monitoring Programme. The Reference Laboratory dealing with air quality, established at NIS, has been equipped with complete sets of monitors and calibration units as originally planned. In addition it was required and also stressed by the Danida Mission that the Monitoring Laboratory has to be able to check and calibrate their own equipment with a complete set of calibration units and gases needed. Also an extra monitoring institution was established in Alexandria to take care of the sites in Alexandria and in the Delta. This was not anticipated from the beginning.

In spite of all these additional equipment we have managed to cut down on the budget thanks to a selection of less expensive equipment at some sites, and the use of inexpensive passive samplers as a supplement to the programme. The Memo of 23 November 1997 (attached) explains the background for the various selections undertaken.

Other additional equipment to the second delivery is specified in the Memo dated 13 November 1997 on "Procurement Ambient Air Quality Instrumentation and Spare Parts, Remaining Equipment". There is no further changes to this list.

Procurement, deviations shipment 2

Comment: Positive Deviation - Units indicates decrease in order

Items	Model	CIF price Unit	Orig. Shipment 2 Units	Orig. Shipment 2 Total_o	New Shipment 2 Units	New Shipment 2 Total_n	Deviation O - N Units	Deviation O - N Total_d
O3 monitor	TEI 49C	50,570.-	4	202,280.-	3	151,710.-	1	50,570.-
Z/S unit, perm., NOx/NOx+SO2	TEI 145	22,180.-	3	66,540.-	2	44,360.-	1	22,180.-
Span unit, perm. , SO2	TEI 43C-400	10,420.-	2	20,840.-			2	20,840.-
SO2 cal. gas, 0.8 ppm, trav. std.		14,370.-	1	14,370.-	5	71,850.-	-4	-57,480.-
NO cal. gas, 0.8 ppm, trav. std.		12,280.-	1	12,280.-	5	61,400.-	-4	-49,120.-
CO cal. gas, 50 ppm, trav. std.		6,590.-	1	6,590.-	2	13,180.-	-1	-6,590.-
HC cal. gas, 2 ppm, trav. std.		7,120.-	1	7,120.-	2	14,240.-	-1	-7,120.-
SO2 perm. tubes, TEI 145	177-008-0082-T3	2,356.-	7	16,492.-	6	14,136.-	1	2,356.-
NO2 perm. tubes, TEI 145	177-007-0081	2,473.-	3	7,419.-	1	2,473.-	2	4,946.-
Air intake		29,056.-	3	87,168.-			3	87,168.-
Met Relative humidity calibrator	510070	2,948.-			1	2,948.-	-1	-2,948.-
Shelter data acq.	GW P5-133	63,308.-	12	759,696.-	8	506,464.-	4	253,232.-
PM10 HiVol	TEI 610	37,376.-	6	224,256.-	5	186,880.-	1	37,376.-
VOC sampler 1)		19,241.-	5	96,205.-	6	15,000.-	-1	81,205.-
Rack for monitors	EDR20086	2,756.-	9	24,804.-	1	2,756.-	8	22,048.-
Lab. env., Rel. Hum.+Temp.	Va HMP 231	38,305.-			1	38,305.-	-1	-38,305.-
O3 calibrator	TEI 49CPS	45,810.-			1	45,810.-	-1	-45,810.-
SO2 cal. gas, 100 ppm, ref. std.		11,270.-			1	11,270.-	-1	-11,270.-
NO cal. gas, 100 ppm, ref. std.		11,270.-			1	11,270.-	-1	-11,270.-
CO cal. gas, 5000 ppm, ref. std.		8,510.-			1	8,510.-	-1	-8,510.-
HC cal. gas, 200 ppm, ref. std.		8,810.-			1	8,810.-	-1	-8,810.-
Wet gas meter 20 l/min 2)	Ri TG20	25,192.-	1	25,192.-	1	26,349.-		-1,157.-
		Total sum:		1,571,252.-		1,237,721.-		333,531.-

Remarks:

1) A simpler and cheaper sampler has been chosen to reduce the costs

2) Ritter offered a model that later proved to be not suitable

Cost deviations

Original shipment 2:	1,571,252.-
New shipment 2:	1,237,721.-
Deviation:	333,531.-

Spareparts and consumables monitors

Numbers are based on 50% installation in 1998 and 100% installation in 1999

During installations only 50% of consumables as specified by kontram are used.

p/n	Item	Spare parts/Instrument/5 years (Supplier)											Tot. 2 yr	Unit pr. Dkk	Total Dkk	Comments
		42C	43C	48C	49C	PS	55C	145	146	1150	pm10	Log				
2-2962	Dessicant cartridge						6						4	611.-	2,444.-	
2-2963	Deionizer pack						6						4	567.-	2,268.-	
1158	RTD						1							477.-		
4070	Filter element, fan	4	4	4	4	4	4						20	106.-	2,120.-	
4118	Capillary, 08 MIL S				1	1							2	137.-	274.-	
4119	Capillary, 08 MIL L	1											3	137.-	411.-	
4121	Capillary, 10 MIL L							1	1				2	137.-	274.-	
4127	Capillary, 15 ML L	1											3	137.-	411.-	
4158	Charcoal, activated	4						4		4				381.-		Buy 10 kg in bulk
4233	Temp. cont., 250-500C									1				3,004.-		
4291	Scrubber, O3	1											1	1,035.-	1,035.-	?
4293	Dryer, O3 generator	1												1,332.-		Buy 10 kg in bulk
4314	Filter, element, type 90							2					4	133.-	532.-	
4320	Filter element (pk/25)	2	2	2	2								12	1,601.-	19,212.-	
4341	Gasket, viton (pk/2)	1											10	9.-	90.-	
4509	Fuse, 2 amp s/b (pk/5)				1	1			1				4	38.-	152.-	
4510	Fuse, 3 amp s/b (pk/5)	1	1	1				1		1			5	38.-	190.-	
4800	O-ring, viton (pk/10)	1	1		1	1		1	1				5	27.-	135.-	
4802	O-ring (pk/5)								1				5	18.-	90.-	
4803	O-ring	1							1				10	8.-	80.-	
4806	O-ring	1											10	11.-	110.-	
4808	O-ring	1	1										10	16.-	160.-	
4811	O-ring		1										10	14.-	140.-	
4820	O-ring		1										10	8.-	80.-	
4821	O-ring	1											10	12.-	120.-	
4822	O-ring	1											10	12.-	120.-	
4829	O-ring		1										10	16.-	160.-	
4830	O-ring, (pk/2)		1										10	14.-	140.-	
4831	O-ring, (pk/2)		1										10	16.-	160.-	
4910	Fuse (box of 5)											1	2	50.-		
5013	Pump repair kit, Thomas							4					4	281.-	1,124.-	
6652	Glass chamber, perm oven							1						417.-		
6998	Desiccant, dri-rite mtl (2 lb)	1											2	266.-	532.-	
7075	Purafil, (pound)							4						364.-		Buy 5 kg in bulk
7336	Capillary, 18 MIL L			1									2	137.-	274.-	
7361	Source IR			4									4	252.-	1,008.-	
8119	Mode solenoid valve	x														Price unknown
8186	Reactor, CO/HC (111)									1				4,030.-		
8193	Repair kit, compressor (K264)									4			4	336.-	1,344.-	
8510	Fuse, (pk-5)						1						2	38.-	76.-	
8540	Lamp photometer (49)				2	1							3	1,278.-	3,834.-	
8548	Washer teflon				4	2							10	16.-	160.-	
8549	Gasket, silicon (8546)				1	1							10	33.-	330.-	
8573	Solenoid valve				x	x							1			Price unknown
8579	O-ring, silicon (pk/5)				1	1							5	20.-	100.-	
8606	Pump repair kit, KNF		4	4	4	4	4						20	252.-	5,040.-	
8645	Lamp ozonator (49)					1			1				2	1,068.-	2,136.-	
8919	Capillary, 13 MIL L		1										4	137.-	548.-	
8666	UV lamp		1										2	3,881.-	7,762.-	
9212	O-ring (pk/5)	1											5	23.-	115.-	
9267	Pump repair kit, KNF (9263)	4											10	446.-	4,460.-	
9269	Converter cartridge, molycon	1												3,729.-		
9788	Cleanser, O3	2											4	1,518.-	6,072.-	?
9973	Ozonator assy	x														Price unknown
12190	Filter, inlet (includes 12188 gasket)						1						1	448.-	448.-	
14950	Thermal fuse						3						2	299.-	598.-	
18074	Ignitor						4						4	119.-	476.-	
11029	FID O-ring						2						2	119.-	238.-	
11030	Thermocouple O-ring (pk-5)						1						1	60.-	60.-	
20100	Valve rebuild kit						2						2	597.-	1,194.-	
20110	Thermocouple assy, flame sensor						1							239.-		
20125	FID rebuild kit						2						2	597.-	1,194.-	
20150	Actuator rebuild kit						2						2	119.-	238.-	
20200	Column (CH4-NMHC spc)						1							2,984.-		
KBGAM314	Filter media, glass fibre											2	2	1,429.-	2,858.-	
HPRINT02	Roll, printer paper											12	20	109.-	2,180.-	

Spareparts and consumables monitors

Numbers are based on 50% installation in 1998 and 100% installation in 1999

During installations only 50% of consumables as specified by kontram are used.

p/n	Item	Spare parts/Instrument/5 years (Supplier)											Tot. 2 yr	Unit pr. Dkk	Total Dkk	Comments
		42C	43C	48C	49C	PS	55C	145	146	1150	pm10	Log				
KBGAM117	Gasket set										2		3	735.-	2,205.-	
ZACVANC01	Pump repair kit										5		9	649.-	5,841.-	
KBGAM118	Tubing set										1		1	150.-	150.-	
KBGAE316	Battery pack, clock										1		1	259.-	259.-	
	Analog to digital converter											1		5,910.-		
	Digital control PC board											1		4,210.-		
	Analog input MUX 16 diff.											1		4,210.-		
	Digital control relay interface											1		4,210.-		
	Station Manager PC											1		13,610.-		
177-005-0082	SO2 perm. tubes, TEI 43C-400		3										5	2,020.-	10,100.-	Do not buy now
177-008-0082-T33	SO2 perm. tubes, TEI 145		3										11	2,020.-	22,220.-	Do not buy now
177-007-0081	NO2 perm. tubes, TEI 145	3											12	1,920.-	23,040.-	Do not buy now
	100±1% ppm NO gas cyl+reg													11,270.-		Not larger then 10 l
	100±1% ppm SO2 gas cyl+reg													11,270.-		Not larger then 10 l
	5000±1% ppm CO gas cyl+reg													8,510.-		Not larger then 10 l
	200±1% ppm CH4+C3H8 gas cyl+r.													8,810.-		Not larger then 10 l
	0.8±10% ppm NO gas cyl+reg													12,280.-		Not larger then 10 l
	0.8±10% ppm SO2 gas cyl+reg													14,370.-		Not larger then 10 l
	0.8±10% ppm CO gas cyl+reg													6,590.-		Not larger then 10 l
	2±10% ppm CH4+C3H8 gas cyl+r.													7,120.-		Not larger then 10 l
														Total:	139,122.-	

Spare parts high volume samplers
Numbers are based on 50% installation in 1998 and 100% installation in 1999
During installations only 50% of consumables as specified by kontram are used.

p/n	Item	Spare parts/Instrument/5 years (Supplier) pm10	TSP	Tot. 2 yr	Unit pr. Dkk	Total Dkk	Comments
AWAAXXX8	Calibration orifice kit	2	1		6,836.-		Already ordered!
GGNR0001	Gasket, neoprene (17.5")	4		8	159.-	1,272.-	
GGNR0002	Gasket, neoprene (9x11)	4	3	8	42.-	336.-	
GGNR0006	Gasket, inlet clean ring	4		8	50.-	400.-	
GGNR0007	Gasket, inlet housing	4		8	50.-	400.-	
GGNR0008	Gasket, inlet clean/plug	4		8	42.-	336.-	
GGNR0009	Gasket, neoprene (2.5")	4	3	8	42.-	336.-	
HENCL014	Carrying case for cal. kit	2	1		986.-		Any ordered?
HBRUSH02	Brush inlet cleaning	6		10	33.-	330.-	
HFLTR001	Filter media, microquartz	10		20	1,148.-	22,960.-	
HFLTR002	Filter media, microquartz		2	2	660.-	1,320.-	
HMISC009	Inlet oil, multiweight	2	1	4	117.-	468.-	
HMISC011	Pressure recorder pen	30	30	40	85.-	3,400.-	
HMISC012	Pressure recorder pen arm	1	1	4	85.-	340.-	
HMISC035	Manometer oil, red	1		1	84.-	84.-	
HCHART01	Chart paper, circular (pk-25)	10	10	15	133.-	1,995.-	
KHVAM206	Cassette cartridge	6	1	5	1,203.-	6,015.-	
KHVAM305	Assembly, brushless M/B, 220/50	2	2		5,850.-		
MAAAAH03	Plug, cleaning assy	2		4	259.-	1,036.-	
MAAAAH04	Ring, space, cleaning assy	2		4	184.-	736.-	
MASAAH07	Cover, protective cassette	6	1		143.-		
					Total:	41,764.-	

Spareparts meteorology

Numbers are based on 50% installation in 1998 and 100% installation in 1999

During installations only 50% of consumables as specified by kontram are used.

p/n	Item	Spare parts/Instrument/5 years (Supplier)		Tot.	Unit pr.	Total	Comments
		Stat.	Port.	2 yr	Dkk	Dkk	
1812	Aluminum cup assembly for m014	2		2	597.-	1,194.-	
1888	Bearings	10		12	114.-	1,368.-	
1898	Bearings		10	10	120.-	1,200.-	
2017	Potentiometer assembly for m024	2	3	2	923.-	1,846.-	
2106	Vane assembly for m024	2		2	675.-	1,350.-	
510070	Relative humidity calibrator	1	1		2,948.-		
590051	Fan motor for m0788	2			511.-		For what?
820200	Relative humidity chip	3	3	3	817.-	2,451.-	
083C-0-35	Relative humidity/temp. sensor	1	1		5,328.-		
62	Differential temperature sensor	2			1,420.-		
97	Solar radiation sensor w/pn1289	1	1		3,019.-		
34	Wind speed and direction sensor		1		3,268.-		
	7 Amp. hour battery		1	1	390.-	390.-	
					Total:	9,799.-	

Spareparts laboratory environment
Numbers are based on 50% installation in 1998 and 100% installation in 1999
During installations only 50% of consumables as specified by kontram are used.

p/n	Item	Spare parts/Instrument/5 years (Supplier) Mon	Ref	Tot. 2 yr	Unit pr. Dkk	Total Dkk	Comments
HM16663	Humidity sensor	1	1	2			
32.208.424	Temperature sensor	1	1	2			
HM16452	Sintered filter	1	1	2			
9100-1004p	CO-cell	1	1	2			
				2	2,840.-	5,680.-	Total for all items
					Total:	5,680.-	

Mon = Monitoring lab.
Ref = Reference lab.

Spare parts sequential samplers
Numbers are based on 50% installation in 1998 and 100% installation in 1999
During installations only 50% of consumables as specified by kontram are used.

p/n	Item	Spare parts/Instrument/5 years (Supplier) FK	FKS	SF1	2FS	Tot. 2 yr	Unit pr. Dkk	Total Dkk	Comments
9721	Particulate fallout collector w/lid			5		22	381.-	8,382.-	
	Sintered glass in bulb	5				49	167.-	8,183.-	7 as spares
NK-VPO 125	Pump	1				1	1,429.-	1,429.-	
	Timer	1	1			2	709.-	1,418.-	
	Intakes	5	5			20	248.-	4,960.-	
	Filter holder, two stage inline		5	5		192	333.-	63,936.-	49 as spares
N-75 KVE	Pump		1			1	2,858.-	2,858.-	
							Total:	91,166.-	

FKN = FK NO2
FKS = FK SO2
SF1 = Dust fall sampler
2FS= Two filter sampler

Accessories

p/n	Item	Spare parts/Instrument/5 years (Supplier)	Tot.	Unit pr. Dkk	Total Dkk	Comments
#1805-xx	Signal cable for 014A-1, w. speed		6			x+12m
#1806-xx	Signal cable for 024A-1, w. dir.		6			x+12m
	Signal cable for 083C-0-35, rh		6			(x+12, x+3)m, 2?
1958-xx	Signal cables for 062, temp.		6			(x+12, x+3)m
#2437-xx	Signal cable for 097, temp. shield		6			(x+12, x+3)m
	Power cable for 076B-12, solar rad.		6			x+5m
	Signal wires, 4 threads with shield		1			For monitors, 100m
	25 pin male RS232 connector		6			For PM10 monitor
	220V extension cable w/5 sockets		30			For stations
	Multicolored 'flat' signal cable		1			For met. trans., 20m
	Teflon tape		7			For swagelok fittings
	Black flexible rubber tape, '88 tape'		10			
	Laboratory items		1			Alex, use 1/2 Reflab
MMF-1 S40F	Mini Master flowmeter		20			For trv. std.
CWH306	Azlon Y connector 6mm PP		20			For trv. std.
				Total:		

Accessories will be procured later

EIMP

Air Quality Procurements

	1996	1997	1998	1999	2000	Total
Budget (DKK)	5990000	2905000	25000	25000	25000	8970000
Procured Air + Reflab	6163447	0	2624419			8787866
RefLab equipment	671814	0	40360			712174
						0
Used and committed, Air Mon.	5491633	0	2584059	0	0	8075692
Scheduled purchases	0	0	100000			100000
Anticipated additionals	0	0	0			0
Remaining	498367	3403367	744308	769308	794308	794308

Scheduled purchases in 1998 include:

Furnitures and shelfs purchased locally
for Monitoring Laboratory and some sites.

The Ambient Air Database has not been included in the Procurement from the Air Monitoring Component

Note

Environmental Information and Monitoring Programme

EEAA - Danida - COWI

30 Misr-Helwan Street
Maadi, Cairo, Egypt

Tel.: (+202) 351 0970
Fax: +202 378 5478

E-mail: eimp@intouch.com

Subject Procurement of NILU equipment versus other vendors

Date 23 Nov 1997

To Jan Hassing

Copy Mohamed Nassar, Mohammed Fahty

From Leif Marsteen, Bjarne Sivertsen

Introduction

Questions have been raised concerning why some of the sampling equipment was recommended to be procured from NILU prior to equipment from other vendors. This can be read from the evaluation reports that was made on the basis of the received bids. This note summarises and clarifies the subject and also discuss some additional equipment requested for the measurement network.

Sequential sampler SO2

COWI was given the names of three companies, URG, AGL and NILU, which should receive invitation to bid on the sequential sampler and dust fall sampler. Only AGL and NILU replied.

Neither AGL nor NILU offered a sequential sampler capable of sampling both SO_2 and NO_2 with the same instrument.

AGL offered a sequential sampler based on 7 days of 24 hour sampling of SO_2 in solution bottles. This is the way SO_2 sampling is performed in Egypt today. A major problem with solution bottles is evaporation of the solution because of the hot environment. The analyses of SO_2 have been questioned at several occasions.

NILU offered a sequential sampler based on 7 days of 24 hour sampling of SO2 on impregnated filters. The method involves no solution. The impregnated filter is a dry filter, easy to handle and very suitable for hot conditions.

Both samplers can sample Black smoke on a prefilter.

The NILU sampler was considered the most adequate sampler.

Sequential sampler NO2

AGL did not offer a sequential sampler for sampling NO2. Instead they offered a passive sampler with a sampling period of 7 days. The passive sampler is inexpensive and suitable for hot conditions. In the procurement

document a sampling time of 24 hours was specified not 7 days so the sampler is not adequate.

NILU offered a sequential sampler base on 7 days of 24 hour sampling of NO2 on impregnated filters. The method involves no solution. The impregnated filter is a dry filter, easy to handle and very suitable for hot conditions.

None of the samplers can sample Black smoke on a prefilter.

The NILU sampler was considered the most adequate sampler.

Dust fall sampler
AGL offered two types of dust fall sampler, one dish type and on traditional bucket type. We have no experience with the dish type and recommended the bucket type which is used world wide.

NILU offered the bucket type dust fall sampler identical to the one offered by AGL. The only difference is the producer. The NILU bucket has been selected an international reference and is given in the ISO specifications for dust fall measurements

Both bidders offered identical and adequate equipment. To reduce the number of suppliers NILU was chosen although the Dust fall sampler and the Sequential sampler are not in the same bid group.

VOC sampler
Adequate VOC samplers was offered by several bidders. Kontram was chosen to reduce the number suppliers. Later the VOC sampler was taken out of the procurement because of its high price and limited output. The cleaning of the canister between samplings also proved to be a problem in Egypt.

We want to introduce a less expensive system for the VOC sampling, and simultaneously start a longer training of laboratories. NILU can offer an inexpensive VOC sampler (vacuum steel canister) and have long experience in cleaning and evacuating the canister. The analysis will as a beginning be performed by NILU. At the same time training will be given to the Monitoring Laboratory to transfer the analyses to Egypt.

We recommend to buy the VOC sampler from NILU. We have not asked for any bid.

Passive sampler
The passive sampler was not specified in the procurement document. We have introduced it to the Air Quality Monitoring Programme for Egypt as an inexpensive sampler for measuring SO_2 and NO_2 in remote areas, in background areas and at histroical monuments.

NILU can offer passive samplers for SO_2 and NO_2 .

AGL can offer a passive sampler for NO_2 . It is unknown whether AGL can offer a passive sampler for SO_2 .

Both AGL and NILU should be invited to bid on the SO_2 and NO_2 passive samplers. We have not asked for any bids.

The two filter sampler

The two filter sampler has been developed by NILU. It samples PM10 and PM2.5 (dust particles less then 10um and 2.5um respectively) over a specified time period, normally 24 hours. It can be set by a timer. It is a simplified version of the NILU SO_2 sequential sampler. It includes only one filter holder as opposed to the 8 filter holders in the sequential sampler. The samplers performance has been well documented. The filter holder is the same as the one used in the sequential sampler which reduces the spare part costs. We do not know of any other producers making similar equipment.

The High volume sampler, already procured, will be used for measuring PM10 (dust particles less then 10um) at 8 locations. We want to increase the number of PM10 measurement sites without exceeding the budget. Therefore we have recommended the NILU two filter sampler at 8 additional sampling sites instead of the much more expensive high volume samplers.

We recommend to buy the two filter sampler from NLU. We have not asked for any bid.

EIMP

Evaluation

Ambient air quality instrumentation

EIMP - Egypt

Bidder:	NILU
Group:	4 - Sequential air samplers 6 - Dust fall

Equipment: Sequential air sampler

Bidder	NILU
Product maker	NILU
Type	
Conclusion	Adequate. Good. Impregnated filters, no solution bottles. There is one model for SO_2+Black Smoke sampling (two stage filters) and one model for NO_2 sampling. Ask for cost of impregnated filters for 5 years operation.

Qualification requirements	
Power requirements: 220 - 240 V.	OK
Suiteable for absorption solution or preferably impregnated filter (one or more stages).	OK. Impregnated filters, SO2+BS (two stages) or NO2
Prefilter for black smoke sampling for reflectometric analysis.	OK. Only with SO2
The sampler should if possible be able to sample SO_2 and NO_2 simultaneously at some sites, see table 1.	Not possible
Necessary filters, filter packs and absorption solution bottles.	OK. Two sets for 1+1 week operation
Flow rate: 0.03 m^3/h - 1 m^3/h.	OK
Sampling time: 24 hours.	OK
The supplier shall provide concise and clearly written documentation in English language (or other language accepted by the costumer) which provides the following data:	OK. English
clearly written instructions for routine use and maintenance.	OK
a specification of equipment performance characteristics and productivity.	OK
full health and safety information.	Info missing

Spare parts	
Accessory and spare parts kit for 5 years' operation, according to supplier's experience. Budget for spare parts must be cleary specified.	OK
Packing and delivery, installation and training	
Packing and delivery	
Delivery of equipment to Cairo including insurance, packing and transportation should be provided by the supplier.	OK: DDU Cairo
The delivery shall take place less then two months after acceptance of the contract. If otherwise the time of delivery shall be specified by the supplier.	OK. April 1998 if order placed before 1 December 1997
The bidder is responsible for a packaging that ensures against damage during transportation to Cairo.	OK
Installation	
The sequential air sampler shall contain instructions in English and also preferably in Arabic that enable installation and start of operation by a person with a degree in science.	OK. English
Training	
Installations and some basic training should be supported by experts from the supplier.	OK
Operation and maintenance	
Operation and maintenance for five years costs must be clearly specified with a workload of twenty-four hours a day.	OK. Cost of impregnated filters are not specified
After sales facilities/incidental services	
Price for repair including transportation expenses shall be quoted as an example: e.g. price for repair of faulty filter pack.	OK. Pump DKK 5715,- Repaired in Egypt by maintenance personnel
Time for repair shall be quoted, with repair of faulty filter pack given as an example.	OK. Pump. 1 hour
Name and location of nearest organization for incidental services shall be specified.	NILU, Norway
Warranty	
Warranty of a minimum of 1 year for overall equipment is required. The warranty period shall be specified.	OK. 1 year

Equipment: Dust fall sampler

Bidder	NILU
Product maker	NILU
Type	Cylindrical, polyethylen
Conclusion	Adequate. Good. Ask for possibilty to mount the stand on concrete surface

Qualification requirements	
Dust fall sampler of inert material, e.g. polyethylen.	OK. Polyethylen
Sylindrical shape.	OK
Height of sampler: 400 mm.	OK
Diameter of open end: 200 mm.	OK
Mounting pole included.	OK. For mounting in soil. Ask for mounting on concrete.
Height above ground to open end of sampler: 1.5 m - 2.0 m.	OK
Operating temperature: +5 °C to +40 °C.	Info missing
The supplier shall provide concise and clearly written documentation in English language (or other language accepted by the costumer) which provides the following data:	OK. English
clearly written instructions for routine use and maintenance.	OK
a specification of equipment performance characteristics and productivity.	OK
full health and safety information.	OK

Spare parts	
Accessory and spare parts kit for 5 years' operation, according to supplier's experience. Budget for spare parts must be cleary specified.	OK
Packing and delivery, installation and training	
Packing and delivery	
Delivery of equipment to Cairo including insurance, packing and transportation should be provided by the supplier.	OK
The delivery shall take place less then two months after acceptance of the contract. If otherwise the time of delivery shall be specified by the supplier.	OK
The bidder is responsible for a packaging that ensures against damage during transportation to Cairo.	OK
Installation	
The dust fall sampler shall contain instructions in English and also preferably in Arabic that enable installation and start of operation by a person with a degree in science.	OK. English
Training	
Installations and some basic training should be supported by experts from the supplier.	OK
Operation and maintenance	
Operation and maintenance for five years costs must be clearly specified with a workload of twenty-four hours a day.	OK
After sales facilities/incidental services	
Price for repair including transportation expenses shall be quoted as an example: e.g. price for repair of faulty sampler.	Info missing
Time for repair shall be quoted, with repair of faulty sampler given as an example.	Info missing
Name and location of nearest organization for incidental services shall be specified.	NILU, Norway
Warranty	
Warranty of a minimum of 1 year for overall equipment is required. The warranty period shall be specified.	OK. 1 year

EIMP

Evaluation

Ambient air quality instrumentation

EIMP - Egypt

Bidder:	Ritter - second bid
Group:	7 - Wet gas meters

Equipment: Wet gas meter 20 l/min

Bidder	Ritter
Product maker	Ritter
Type	Wet gas meter
Conclusion	Adequate. Good. This is the TG 20 model.

Qualification requirements	
Power requirements: 220 - 240 V.	OK
Range: 0 - 20 l/min.	OK
Traceable certification of calibration of the wet gas meter.	OK
It must be possible to both push and pull the air through the meter.	OK
Accuracy: 0.5 % of full scale.	OK
Output signal proportional to measured value for connecting to the reference lab data aquisition and control system.	OK
The supplier shall provide concise and clearly written documentation in English language (or other language accepted by the costumer) which provides the following data:	OK. English. Operating instructions
clearly written instructions for routine use and maintenance.	OK. English
a specification of equipment performance characteristics and productivity.	OK
full health and safety information.	OK

Spare parts	
Accessory and spare parts kit for 5 years' operation, according to supplier's experience. Budget for spare parts must be cleary specified.	OK. No replacements
Packing and delivery, installation and training	
Packing and delivery	
Delivery of equipment to Cairo including insurance, packing and transportation should be provided by the supplier.	OK. CIF Egypt
The delivery shall take place less then two months after acceptance of the contract. If otherwise the time of delivery shall be specified by the supplier.	N/A
The bidder is responsible for a packaging that ensures against damage during transportation to Cairo.	OK
Installation	
The wet gas meter shall contain instructions in English and also preferably in Arabic that enable installation and start of operation by a person with a degree in science.	OK. English. Operating instructions.
Training	
Installations and some basic training should be supported by experts from the supplier.	OK. No training required.
Operation and maintenance	
Operation and maintenance for five years costs must be clearly specified with a workload of 1 hour a day.	OK. No maintenance required.
After sales facilities/incidental services	
Price for repair including transportation expenses shall be quoted as an example: e.g. price for repair of faulty air flow indicator.	OK. DDK 2560,- + transportation and customs
Time for repair shall be quoted, with repair of faulty air flow indicator given as an example.	N/A
Name and location of nearest organization for incidental services shall be specified.	Ritter, Germany
Warranty	
Warranty of a minimum of 5 years for overall equipment is required. The warranty period shall be specified.	1 year.

Appendix G

Seminar: Air Quality Monitoring Programme for Egypt.

Egyptian Environmental
Affairs Agency
EEAA

Danish International
Development Assistance
DANIDA

Environmental Information
Monitoring Programme
EIMP

Welcome you to the seminar

Air quality Monitoring Programme for Egypt

at Tabbin Institute (TIMS)

27 October 1997

Egyptian Environmental Affairs Agency
EEAA

Danish International Development Assistance
DANIDA

Environmental Information Monitoring Programme
EIMP

Title of the seminar : ***Air quality Monitoring Programme for Egypt***
Seminar Venue : Tabbin Institute (TIMS)
Date of the Seminar : 27 October 1997

09:00	Registration
	Opening ceremony
10:00	Welcome. Dr S.Khalil Director Tabbin Institute
10:10	The Danida/EIMP programme. Mr. John Carstensen
10:20	Opening of the seminar H.E. Minister of State for Environmental Affairs, Mrs. Nadia Makram Ebeid
10:40	Opening of the Air Quality Monitoring Station at Tabbin Institute, by H.E. Minister of State for Environmental Affairs.
	Coffee break
11:20	The role of Air Quality Monitoring and Information Dr ElZarka
11:40	Why monitor air quality? By Team Manager Bjarne Sivertsen
12:00	The modern air pollution monitoring and surveillance programme, (Bjarne Sivertsen)
13:00	Lunch
14:00	Emission inventories as collected by the Pollution Source Database component (Gihane Bayoumi)
14:15	The application of air pollution data Air quality planning and optimal abatement. (Bjarne Sivertsen)
15:00	The air quality monitoring programme for Egypt. Selected indicators, siting studies and instrumentation (Mohammed Nasar)
15:45 -16:00	Summary and Discussions

EIMP

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

Seminar
Air Quality Monitoring Programme for Egypt

The seminar will represent an introduction to the air quality monitoring programme that will be established as part of the Danida EIMP programme developed for EEAA.
The seminar will also serve as an introduction to a workshop that will be conducted for all participants of the programme during the rest of this week.

A modern air quality monitoring and information system will be established for Egypt as part of the EIMP programme. The measurements will combine on-line monitoring and standard sampling methods of the most important air pollutants and meteorology. The selected pollutants is in accordance with the air quality standards given in the environmental laws of Egypt, and is also similar to the internationally recognised air pollutants as given by e.g. the World Health Organisation.

The key features of the modern environmental information system is the integrated approach that enables the user in a user friendly way to not only access data quickly, but also use the data directly in the assessment and in the planning of actions. The demand of the integrated system to enable monitoring, forecasting and warning of pollution situations has been and will be increasing in the future.

The data may also be used for generating new indicators that relate directly to health impacts. This will require that numerical dispersion models for air pollutants will be developed in the future. Results of the monitoring programme with on-line data input will serve as information to politicians to planners and to the public. They will also serve as input to other experts working in fields of environment, cultural heritage or health.

Environmental data collected through the automatic monitoring and telematic network will be quality controlled and transferred for storage in the integrated relational databases. Statistical programmes for control of quality and representativeness will be used, and the first results can within one hour after field collection be presented using user-friendly graphical tools.

The information may be multimedia: texts, tables, graphs, images, sound or video dependent on the end user. The presentations have to be designed to meet the user needs.

These users may be:

- authorities at different levels (municipal, regional, national, international),
- industrial users,
- schools, universities and the scientific community,
- various organisations,
- the public and media.

The work so far has identified about 40 sites covering all Egypt, where air quality measurements will be undertaken. The most advanced programme will be established in the Cairo and in the Alexandria area. Sites have also been selected in the Delta, in the Canal area and in Upper Egypt. A specially designed simplified sampling programme has been designed to cover historical monuments from Giza to Luxor and Aswan.

The Monitoring Institution selected to serve the programme in Egypt is the Environmental Hazard Mitigation Centre (EHMC) at Cairo University. Also the Institute of Graduate Studies and Research at the University of Alexandria will serve as a local Monitoring Laboratory for Alexandria and the north western Delta area. Final presentations of the results seen from a political point of view, and compared to national and international standards of the environment will be prepared in the future by EEAA.

The first monitoring station has been established and is in operation et Tabbin Institute. The next site will be in operation at Cairo University. We will then establish more stations in Cairo and further in Alexandria. It will take several months to finalise the total establishment. It is anticipated, however, that data and results will be available in the very near future. Air pollution data can already be obtained from the Tabbin station.

OPENING OF AIR QUALITY NETWORK

افتتاح الشبكة القومية لرصد ملوثات الهواء غدا

كتبت ـ سالى وفائى:

تفتتح السيدة ذادية مكرم عبيد وزيرة الدولة لشئون البيئة غدا الشبكة القومية لرصد ملوثات الهواء فى مصر بتمويل من هيئة المعونة الدنماركية.

وصرحت الوزيرة بأن الشبكة تعد اضافة بيئية مهمة لمصر حيث تتكون من ٤٠ محطة للرصد المستمر فى المناطق الصناعية والحضرية موزعة فى ١٨ محافظة بعضها مزود بمحطات أرصاد جوية لقياس سرعة واتجاه الريح ودرجة الحرارة والرطوبة لتفسير الأرقام والنتائج، مؤكدة أن أجهزة الشبكة هى أحدث ما وصلت إليه التكنولوجيا العالمية لقياس ملوثات الهواء المختلفة.

من جهة أخرى دعا مجلس وزراء البيئة العرب فى ندوة «العمارة الخضراء» التى عقدت بمقر جامعة الدول العربية مجلس وزراء الاسكان والتعمير إلى إدراج كل المقومات التى تحافظ على البيئة العربية فى التصميم والتنفيذ، ودعم التعاون والتنسيق بين المنظمات العربية والإقليمية والدولية لمواجهة التحديات البيئية وترسيخ مبادىء العمارة الخضراء.

وأكد المجلس ضرورة تشجيع المؤسسات الوطنية التى تبحث تطوير المساكن ومواد البناء وإجراء ابحاث لاستغلال الطمى المتراكم فى قاع السدود لانتاج الطوب النارى عالى الكفاءة بدلا من إستهلاك التربة الزراعية إلى جانب نقل وتطويع التقنيات عالية الكفاءة والمتوافقة مع البيئة لتحسين إستخدامات الطاقة وترشيد استهلاكها خاصة فى قطاعى النقل والبناء والتوجه نحو إنشاء الحدائق والمتنزهات فى الاحياء السكنية بما يتناسب مع حجمها.

Al Ahram 26 Oct. 1997

Appendix H

Workshop: Air Quality Monitoring Systems and its Applications.

EIMP

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

Work shop

Air Quality Monitoring Systems and its Applications
as basis for the Air Quality Monitoring Programme for Egypt

To be held at Tabbin Institute (TIMS)
28 to 30 October 1997

Programme

Tuesday 28 October 1997

09:00 Introduction
The design of an Air Quality Monitoring Programme
10:00 Air Quality Indicators
Air Quality Guidelines and Standards

10:45 Coffee

11:15 Siting and siting studies
Station criteria and various types of instruments
12:15 Air pollution measurements
The measurement station
instrumentation and data retrieval

13:00 Lunch

14:00 Calibration and quality assurance
15:00 Instruments; monitors and samplers
16:00 Visit to the monitoring site at Tabbin

Wednesday 29 October 1997

09:00 Air pollution meteorology
The importance of meteorological data
10:00 Introduction to transport, turbulence and diffusion
Meteorological measurements

10:45 Coffee

11:15 Air pollution modelling
Different types of models
Input data (emissions - stack data - meteorology - air quality)
12:15 Model applications (examples: control strategy , consequences)

13:00 Lunch

14:00 Data presentations and evaluation
Air pollution statistics
Use of meteorological data
Air quality, data interpretations
15:00 Trend analyses peak statistics
User friendly presentations
16:00 Summary and discussions

Thursday 30 October 1997

09:00 Environmental impact from air pollution
Environmental Impact Assessments (EIA)
Consequence analyses
10:00 Optimal abatement strategy planning

10:45 Coffee

11:15 The air quality monitoring system for Egypt
Where are we - what does it contain - who will be responsible?
12:15 Future possibilities
The annual reports

13:00 Lunch

14:00 Summary - questions - comments
Further developments
15:00 Closing

Appendix I

Selection of Ambient Air Pollution Data Base for EEAA.

EIMP

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

Memo

To: Jan Hassing
Copy: Dr M Nasar, L Marsteen, D Clark
From Bjarne Sivertsen
Date: November 1997

Activity D 2.4, EIMP Air Pollution Monitoring
Selection of the Ambient Air Pollution Data Base for EEAA

1. Introduction

Air quality data will be automatically transferred to the Monitoring Laboratory, quality assured and stored in the local data base (a System Manager) delivered by the data retrieving system.

Quarterly data reports will be produced by the Monitoring Laboratory based upon analyses of data performance data availability and some simple statistics.

Processed data and some selected raw data will then be further transferred to EEAA, where the final evaluation and presentation of the results will be produced for the Authorities, for planners and for the public. These reports may be used by decision makers and may support specification of measures to reduce air pollution loads.

For this work the EEAA will need a data base with statistical and numerical tools, included a Geographical Information System (GIS).

2. Needs and requirements

Different types of data will be collected by the air quality monitoring programme. The first specification of the data collection procedures divided the data into sampling data and monitoring data. Air quality data collected by sampling and analyses by semi-automatic samplers will be fed into a simple (Access based) data base containing background information and data including:

- laboratory preparation procedures,
- sampling frequency/ sampling time specifications,
- field work; change of sampling units,
- identification and transfer to laboratory included QA procedures,
- sample preparation data corrections and storage,
- quality assured data.

At air quality monitoring stations each site will be equipped with a data logger unit (a PC). Depending upon the instruments that will be selected, the data are read as analogue signals. Hourly average data will be transferred as raw data via modem and telephone lines to the central computer unit at the Monitoring Laboratory. In some cases they may also be transferred on floppy disks.

Training of expert personnel for this operation at the data retrieval computer will be undertaken as an on-the-job effort. Routine control of all data retrieved is essential on an every day basis. The Monitoring Laboratory will report data corrections, data availability and data quality. Some simple air quality data statistics will be performed as part of the quarterly reports. This work will be based upon the data bases delivered with the data retrieval systems.

EEAA will receive, together with these reports, a selection of raw data and aggregated data from the Monitoring Institutions. These data will have to be stored in the EEAA data base for further evaluation, statistical treatment, graphical evaluation and presentations. A number of statistical programme based upon a GIS system has to be made available. This data base system will have to be developed at EEAA or purchased from already developed and commercially available data base systems.

3. Data bases and presentation tools

Air quality data bases, including statistical tools for presentation of data, are available in a number of institutions responsible for the collection of air pollution information world wide. However, commercially available tools adequate to meet the needs of EEAA in the future are very scarce. An investigation has revealed that most of these data bases have been specially designed to meet the well defined questions asked by specific users; institutions, authorities or organisations.

The Airviro system developed by Indic, now available at SMHI/Indic in Norrkøping, Sweden, is limited by its non-modularity, the requirements of a UNIX workstation and the fact that the system should be designed from scratch to meet the specific requirements of this system.

Other data bases and data presentation tools investigated have been designed to meet national or international monitoring programmes and will usually not be easily transformed to the needs of EEAA.

AirQuis is part of the ENSIS system, which is an integrated GIS-based environmental data management systems developed by Norwegian Research institutions. AirQUIS has been developed by NILU and implemented in Norwegian cities and internationally. AirQUIS operates in several modules, including ambient air quality data, air emission data, dispersion and exposure modelling and a user friendly presentation system. It has the ability of adaptation to specific user needs.

4. Advantages and disadvantages of AirQUIS at EEAA

AirQUIS can be easily adapted to the needs of the user and to the requirements specified in the different countries. The system is a multi-user client-server database application programmed in MS Visual Basic. It has several advantages:

- The database system is under continuing development by NILU,
- it supports several years of data,
- it can be customised by the user,
- it provides graphic display of data,
- it facilitates the development of customised reports
- it supports the use of air quality dispersion models.

One disadvantage of a system like AirQUIS is that it requires trained users with background in the field of air pollution. Service and support agreements have to be established with NILU, even if local IT experts will be trained in the technical structure and in the operation of AirQUIS. These experts will in the future also be able to undertake some local support.

Concerning comments indicating that "The system could be obsolete in about 5 years time", NILU has selected a most modern platform for the system and will develop the system continuously with annual releases of updated versions. These can be implemented by EEAA based upon mutual agreements. (see ch.7)

5. The application of AirQUIS at EEAA

An integrated GIS-based environmental data management systems like the AirQUIS system is needed as part of the EIMP programme at EEAA to store, estimate and evaluate air pollution emission data (the Emission Inventory Component of EIMP) and to store, evaluate and present ambient air quality data. (the Air Quality Monitoring Component)

Statistical evaluations, user friendly presentations and the generation of the annual report will be undertaken using the AirQUIS database. All the statistical programmes as well as presentation tools are part of AirQUIS. The system will handle both historical data, background information as well as manually sampled and monitored data.

6. EEAA distributed air quality information in the future

The information from the AirQUIS GIS/database may be distributed in many forms; texts, tables, graphs, or images, dependent on the end user. The presentations have to be designed to meet the user needs. These users may be:

- EEAA and the Ministry of Environment
- authorities at different levels (municipal, regional, national, international),
- industrial users,
- schools, universities and the scientific community,
- various organisations,
- the public and media.

The environmental data are usually linked to geographical sites. In particular when monitoring data are supported and supplied by estimates of spatial concentration distributions and impacts, it is suggested that the presentation of the results would involve the use of maps or digitised Geographical Information Systems (GIS).

Geographical information systems based on advanced raster/vector technology has been developed to handle maps, networks, symbols and various objects. They can handle both geographical information and technical documentation and present this in graphical form. The basic raw map information has normally in the past been work-station based. At present user friendly PC based applications has been specially designed as part of AirQUIS for display of air pollution data (emission and ambient).

The GIS user can easily organise selected data from the data base. Thematic maps can be produced combined with time series graphical presentations and results from model calculations.

With the introduction of dispersion models in the future EEAA system, AirQUIS will display the results of planned actions based upon simulation models and thus act as a powerful and more user friendly decision support system.

A wider distribution of environmental data to the public has become a part of the development of modern environmental surveillance and information systems. New approaches have been developed for dissemination of environmental information which can be adapted to different information distribution systems. These systems could be tele-text, public telephone network, special designed health advice information lines, fax distributions, INTERNET networks etc..

Information of air quality in urban areas have been issued to the public on a daily basis described in terms of "very good", "good", " poor" etc. Some European cities, such as the information system for Oslo Norway, already are providing this type of information. The public Internet World Wide Web application for Oslo update the air quality information every hour to yield the last hour air pollution situation in and around the city.

7. AirQUIS service and support agreements

After sales services will be developed between EEAA and NILU. NILU have experience through service- and support agreements based upon the "Norwegian Standard Contract for Computer Deliverables" which includes delivery and support.

The main content in the service/support agreement are:

- Service and support has an annual cost of 20% of the licence which covers only time costs. Travel expenditures are additional.
- The agreement activates after a SAT (Site Acceptance Test) which take place no more than 3 months after installation.

- The service contain: telephone guidance, bug/error fixing using telecommunication, small improvements and corrections issued regularly,
- The agreement describes scientific consultation paid extra on an hourly basis,
- Reduced price for new versions.

For further support at EEAA matters have to be discussed related to the actual situation.

EIMP

Procurement

Specifications for Air Emission Inventory and Ambient Air Quality Database for EEAA

Objective
The EIMP/EEAA Environmental Monitoring Programme needs a database and a data handling system for 1) Point Source Atmospheric Emissions to establish an emission inventory, and 2) the Ambient Air Quality data collected in the monitoring and sampling network for Egypt.

Qualifications
The system delivered must :

1. be installed on computers compatible with the network established at EEAA, including PCs running Windows 95 Arabic Edition.
2. be able to handle emissions data and ambient data,
3. be able to handle point source annual emissions data down to the individual process and stack level, based on emissions factors, engineering calculations and/or stack tests,
4. include default emission factors and emission modelling capability,
5. support estimation of time variation of emissions at time intervals of hours to months,
6. be user-friendly and easy to apply, with English user interface,
7. contain the possibility for several users to work with the data simultaneously,
8. contain data screening and presentation tools,
9. permit user-customisation of
   - exiting data tables, including addition of new fields,
   - existing and new screen forms,
   - existing and new data import and export formats,
   - existing and new data report formats,
10. support ad-hoc queries in analyses and reports, including linking to external databases,
11. include user-friendly geographical (GIS based) and graphical presentation tools,
12. support simple data checks and manual data editing,
13. enable combined analysis of meteorological and ambient air quality data,
14. prepare air quality statistics referring to Egyptian air quality limit values,
15. support storage and management of several years of data,
16. support text fields containing Arabic text, including on screen display and printed reports,
17. include written documentation and user manuals in English,
18. include installation, training and support.

Customisation
Prior to installation, the supplier will visit Egypt to assess the needs for customisation of the system, and to obtain locally-prepared data for selected lookup tables and GIS data for maps and territorial units. The system will then be customised to an agreed initial configuration, and loaded with agreed initial lookup and GIS data, prior to installation at EEAA.

Installation
The system must be installed on an EIMP computer at EEEA, needs on a compatible computer system.

Training
Installation at EEAA must be followed by local training for at least two selcted experts at EEAA.
[training to what level? topics? prerequisites for EEAA "experts"?]

Operation
The use and operation of the system will be at EEAA.. Experts at EEAA should be trained to operate and support the system locally in Egypt. Local experts should also be able to undertake the daily applications and minor upgrading based upon input from the supplier.

Maintenance and service
Maintenance and service agreements should include telephone guidance, bug and error corrections, improvements and minor corrections based upon telecommunication. Updated, new versions issued by the supplier should be available at reduced prices.

Appendix J

Staff Meetings - Minutes

Minutes of Meeting

Subject:	**STAFF MEETING # 17**
Date:	**2 Nov 97**
Place:	**EIMP Office**
Participants:	**JMH, M.Fathy, Anwar, Dina , ERP, Arne, Flemming, Bjarne, Leif, M.Zaki, Lydia**
Prepared by:	**Lydia Kiriacos**
Distribution:	**EIMP Staff (Incl Dr. Mohamed El Zarka)**

Environmental Information and Monitoring Programme

EEAA - Danida - COWI

30 Misr-Helwan Street
Maadi, Cairo, Egypt

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1 Procurement

Anwar stated that all shipments at Alex were released and are ready to distribute and also the shipments at Cairo Airport were released except one.
Concerning the local shopping he stated that it was in progress for all the component.

2 Coastal Water

Arne stated that Flemming Boisen, Erling Povlsen, Sherine, Dr.Beltagi and himself will be in Suez (NIOF) and Alex (IGSR) Monday 3 and Wednesday 5 to discuss the sediment, benthos and coral reef programme. At the same time, F. Boisen will inspect the microbiological facilities and discuss the microbiological programme with representatives of the two institutions.

3 Air Quality

Bjarne stated that the Minister opened the first monitoring site and that they had successfully completed a seminar for Air Quality and 3 days of workshop at Tabbin institute .
He also added that they have tested the computer center at Tabbin institute and they will install the computer center equipment at Cairo University on the 12 November. They will install the equipment at NIS immediately after they finish at Cairo University.

16.11. to Cairo.
23 nov. to NIS

4 Institutional Support

Concerning the computer training course at Ain Shams University, Zaki stated that he has finished the additional session. He also added that there are four computers installed already.
He also added that he was waiting for Jacob`s schedule. JMH added that Jacob will be in Egypt from 20 Nov till 11 Dec.

5 Reflab

Flemming Boisen gave a brief about himself and his work and he added that he has been in Cairo from Monday and that he inspected the facilities at Ain Shams and the equipment at Tebbin stores.

6 Miscellaneous

- M.Fathy stated that TAMA has arranged a training course for Problem solving for two days 3rd and 4th November
- JMH stated that the opinion and comments of the review mission will be forwarded for comments from EIMP/EEAA and the Embassy but the work in the project will continue as it is until further notice (business as usual)
- JMH stated that EIMP has a temporary employee to assist Reflab air
- JMH stated that any faxes or e-mail will be put on the trays on the table in front of Dina and Lydia`s office

EIMP

Minutes of Meeting

Environmental Information and Monitoring Programme

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E-mail: eimp@intouch.com

Subject:	**STAFF MEETING #16**
Date:	**15 Oct 97**
Place:	**EIMP Office**
Participants:	**JMH, Dr.ELZarka, M.Fathy , S.Hassan, S.Khalil, G.Bayouml, Nasar M.Zakl, SAS, Lydia**
Prepared by:	**Lydia Kiriacos**
Distribution:	**EIMP Staff (incl Dr. Mohamed El Zarka)**

1 Procurement

Concerning Reflab water , M.Fathy stated that they delivered a Computer to Ain Shamms at 16th of October.
M.Fathy added that the accounting manager and himself have discussed whose responsibility it is to pay the storage fees. It was agreed that EEAA would be paying it.

2 Institutional support

Zaki stated that he have to visit Alex to follow up the progress of the CWMDB , he added that they will get a new version and that we should tested.

3 Coastal Water

Sherine stated that the Ministry of defence is asking for an actual date for the beginning of work. Dr. Zarka proposed that it to be at 1st of November.

4 Air Quality

Nasar stated that the air pollution seminar will be held on 28th of October and then 3 days workshop will follow.

5 Reflab

Sherif stated that the reflab air equipment will be delivered to NIS and will be functioning by 21th of october.
Dr Zarka asked about the status of purchase of cars. Sherif replied that it has been decided to buy one big car instead of two small in order have a vehicle suitable for travelling long distances. He also added that it was earlier decided that the car will be the property of Danida / EIMP.
He added that the seminar of Reflab will be at mid of November pending the finalisation of the installation of one set of monitors.

7 Miscellaneous

- Zarka asked every counterpart to prepare a reports concerning his/her component.
- Zarka stressed on conforming to the already specified attendance regulation.
- Zarka asked Sherif and Gihane when will be the renewal of their employment contract , they replied that it will be at 22 November and 1 December respectively.

EIMP

Minutes of Meeting

Environmental Information and Monitoring Programme

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Subject:	**STAFF MEETING #18**
Date:	**9 Nov 97**
Place:	**EIMP Office**
Participants:	**JMH, Dr.ELZarka, M.Fathy, S.Hassan, S.Khalil, Anwar, Arne, Fleming, Bjarne, Leif, - Erling, M.Zaki, Samer, Dina, Lydia**
Prepared by:	**Lydia Kiriacos**
Distribution:	**EIMP Staff (incl Dr. Mohamed El Zarka)**

1 Procurement

Anwar stated that he prepares a letter for the customs authority for release of equipment for the point source component. He added that Douglas and a training consultant will be here at 17th of November to start the training activities but Anwar doubt that the equipment will be ready. So he proposes to delay the mission for a week.
JMH replied that he will ask Douglas to postpone the arrival of the training consultant one week to be sure that the equipment will be ready.

2 Coastal Water

Arne stated that he Erling and Sherine went last week to Suez (NIOF) and Alex (IGSR) to discuss the sediment, benthos and coral reef programme. He added that NIOF and IGSR will be invited to submit a tender based up on detailed specifications prepared by EIMP. The results of the two meetings will be used later by EEAA/EIMP for the preparation of the tenders according to Danida standard procedures.

Flemming stated that he attended meetings at Suez to discuss the microbiological facilities and the microbiological programme. He added that IGSR is able to provide two rooms for the laboratory.

Concerning the permissions to enter the coast, Sherine stated that the documents had been delivered to the Ministry of Defence and a copy to the chief of security in EEAA. He is also requesting the time schedule.

3 Air Quality

Bjarne stated that the workshop at Tabbin institute had been finished and the certificates are going to be distributed soonest. He added that they are in the process of installing the equipment at Cairo University.

4 Institutional Support

Zaki stated that they went to IGSR last Wednesday and they installed the first version of database, to be tested and that they have sent a copy to Dr.Ali Beltagi.
He asked Arne to prepare the list of persons who will attend training of CWMDB.
Concerning the point source component, Zaki stated that we received two portables intended for Tebbin.

5 Reflab

Concerning reflab water, Sherif stated that Ulla will give a workshop at Ain Shams in statistical data analysis methods, and that the equipment will be installed in the next few weeks.
Concerning the reflab air, he suggested that Leif give some training before Christmas and he added that the local consultant Mahamoud El Sharkawy is doing a good job. JMH requested Sherif to ask the local consultant to prepare a detailed plan for his training at NIS.

6 Miscellaneous

- SAS asked everyone to use the Exchange and its facilities and to delete the unneeded files or move it to their own hard disk to reduce the server load.

- Arne complained about the transport situation, saying that he had to postpone his meeting held at Suez because the driver came late in the morning (After 9:00 PM which are the normal working hours) Dina replied that this is because the staff are not punctual and the driver has to wait for them so from now on, please try to be punctual and only in few cases will the driver wait maximum for 5 minutes and then leave.

- Dr ElZarka asked for the written plans for the establishment of monitoring stations for Coastal Water and Air Quality. He added that he wanted the time schedule of the visits that Sherine will be making to the Ministry of Defence.

- Dr ElZarka inquired about the causes of delay of Reflab air and Point source.

- Dr ElZarka asked Bjarne to prepare a short report about the visit of the minister to the first station at Tabbin institute.

Minutes of Meeting

Environmental Information and Monitoring Programme

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E-mail: eimp@intouch.com

Subject: STAFF MEETING # 19

Date: 16 Nov 97

Place: EIMP Office

Participants: JMH, Fathy, S.Khalil, Anwar, Nasar, Flemming, Arne, Bjarne, Leif, Dina, SAS, Lydia

Prepared by: Lydia Kiriacos

Distribution: EIMP Staff & Dr. Mohamed El Zarka

1 Procurement

Anwar stated that the large shipment of chemicals was released and it is on its way to our store. The reexportation of the small amounts of "dangerous chemicals" was effected.
Concerning the equipment for the Coastal water monitoring programme, this will be distributed within this week. For point source air emission: one shipment was released and on its way to our stores and the second will be released within 3 days.
JMH replied that Douglas will arrive 17/11.

2 Coastal Water

Sherine stated that Dr. Beltagi suggested to give him the money to buy the computers. JMH replied that concerning the Taiwanese computers, we will ask him to order them and send the invoice for us. Other computers will be bought by EIMP and handed over to NIOF. EIMP will buy the other computers.
She also added that the meeting with Dr. El Raey and Dr. Beltagi about the feasibility of dividing the tasks was postponed. Concerning the benthos, sediment and coral reef program she added that there is still details to be worked out for the sampling locations. NIOF and IGSR will give a statement of interest in the extension of the pollution monitoring with full details of what parts of the work they are interested in and which key staff they will assign to the work.
At the end Sherine gave a brief about the conference which Arne and herself attended last week at Malta. There was reportedly a lot of interest around the two presentations given by Arne and Sherine and much useful information was contained in the conference proceedings.

3 Air Quality

Bjarne stated that they will move the computer center from TIMS to Cairo University. He added that the Air Quality staff had scheduled a meeting later today with CTS. Dr.Amr el Soeuni will begin the training at Cairo university this week.

Seminar: 10. Dec.

He also added that they visited the Meteorological authority which is interested in co-operation with EIMP and EEAA.
Bjarne complained about the lack of communication between reflab air and air quality based on that they were not informed about the meeting between Reflab and Cairo Air Improvement.

4 Reflab

JMH stated that Ulla and Sherif had a meeting with Cairo Air Improvement Programme (CAIP) at NIS in order to let CAIP be further informed about the function of NIS and the potential for cooperation

Flemming stated that he had a meeting at Ain Shams University last Wednesday where he inspected the different facilities.
He also added that he will visit Hurghada next week to inspect the facilities there.

5 Point Source

JMH stated that Douglas will arrive 17/11. He will check the status of his component and prepare for the training visits.
He also added that Dr. Zarka approved that Nasar will temporarily be the contact person with TIMS.

6 Miscellaneous

- Schedule of expatriate input for the remaining part of 1997 is appended
- Fathy stressed on the need of co-operation between Cairo Air improvement and EIMP especially regarding the work at NIS

Name	Week 47	Week 48	Week 49	Week 50	Week 51	Week 52
Jan Hassing						
Arne Jensen				5/12		
Bjarne Sivertsen				6/12		
Leif Marsteen				9/12		
Jacob Andersen	17/11				13/12	
Douglas Clark	17/11		3/12			
Joern Rokkjaer	24/11			12/12		
Susanne Petersen	24/11			6/12		
Thomas Kongerslev			3/12		12/12	
Ulla Lund						
Flemming Boisen				5/12		
Lis Rasmussen	17/11				17/12	
Kirsten Holst						20/12
Ken Earle			6/12			27/12
Freddy Stephensen	21/11		27/11			

Air emiss

Waste water monitor.

reporting

Auto analysers (supplies)
Carb Flex furniture.

Appendix K

Ambient Air Monitoring. Staff meetings, Task for Phase 3 and Memo for A. ElSoueini

Minutes of Meeting Ambient air monitoring

Subject: Weekly planing meeting

Date: 97.10.23

Place: Tebbin

Participants: T. El Araby (Cairo Univ.), A. El Sueini (CTS), Aly (CTS), H. Granath (CTS), M. Nassar (EEAA), B. Sivertsen (EIMP), L. Marsteen (EIMP)

Prepared by: LM/

Distribution: T. El Araby, A. El Sueini, M. Nassar, L. Marsteen, B. Sivertsen, M. Fathy, J. Hassing

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		Init.
1.	**Infrastructure:** The responsibility of EEAA CTS should visit the site before installation starts to see that everything is in order. A split unit air cond. will be preferred at the stations - only a small hole in the wall. El Sueni: Split unit - Le 3000, usual - Le 2200.	
2.	**New installations**	
	Tebbin: Finalised Wednesday 22 October. Last corrections done Sunday 26 October.	CTS
	The NOx and SO2 monitors have been calibrated OK.	CTS/LM
	The PM10 monitor still stops at midnight. Status?	CTS
	PM10 monitor flow was calibrated using the included flow calibration unit. Result?	CTS
	PM10 monitor, air intake too short, must buy new. CTS will check prices and possibility of returning received intake	CTS
	Longer signal cables for the met. stations, CTS will check prices.	CTS
	Wind direction was +45 degrees off. OK now.	CTS
	According to Harri Granath, Kontram, the SO2/NO permeation tube calibration unit requires one more air intake manifold solenoid valve (total of 3) to operate correctly. Kontram must be contacted.	LM
	Status list of serial numbers?	CTS
	CTS has provided a list of data logger data codes.	CTS

Stopped power failure

	Monitoring Laboratory: Remaining equipment except for met. tower. met. sensors. air intake, intake manifold and solenoids was transferred on Sunday 12 October.	MN
	The test installation was finalised at the university Monday 27 October. The delay was caused by problems at Tebbin which had to be operative by Monday 27 October.	CTS
HC and CO →	The HC and CO monitors have not been calibrated. The calibration will take place Wednesday 5 November. EEAA must temporarily transfer the reference gases from Tebbin to the University before Wednesday 5 November.	CTS MN
	The O3 monitor has not been calibrated, O3 calibrator at NIS.	
	The car has arrived at Tebbin. It awaits registration.	
NO'	**Computer Center:** CTS want to start installation Sunday 26 October. failed from 28.10.	CTS
	El Zarka's signature for transfer of instrumentation must be obtained on Sunday 26 October and transfer of instruments must be done the same day. 2. nov.	MN
	Latest: No signature was obtained. CTS tested the Computer Center PC at Tebbin station Tuesday 28 October. Status?	CTS
	El Zarka's signature must be obtained and the instrumentation must be transferred before Wednesday 5 November.	MN
	The installation will take place Thursday 6 November.	CTS
	Cairo University station: The University requests to have the station installed by Wednesday 12 November - big opening.	TA
	CTS will finalise the installation after the Monitoring lab. and Computer Center is installed, probably on Sunday 9 - Tuesday 11 November.	CTS
→	The met. tower will be installed later - new signal cables will be necessary. Who will prepare and provide the holes, bolts and concrete? 9. nov. 97	
	The air cond. is still missing. It should be installed before CTS continues their work. MN will check with Anwar.	MN
	El Gomhoroya street: The test installation will be rigged at Tebbin after finalising the Cairo University station. The installation will probably be on Sunday 16 - Tuesday 18 November. Calibration will be done using the Ref. lab. calibrator and gases.	CTS
	The station will be installed after finishing the installations at the Ref. lab.	CTS
	The SO2 and NO reference gases must be transferred from the	MN

	Monitoring lab. to Tebbin before Sunday 16 November.	
	Reference Laboratory: All equipment except for the calibrator, zero air generator, reference gases and laboratory items where transferred on Saturday 18 October. The PM10 monitor and air intake incl. manifold will not be transferred as it is not necessary at the Ref. lab.	MN
	The test installation will be rigged at NIS after finalising the Gomhoroya test installation at Tebbin. The installation will probably be on Sunday 23 - Tuesday 25 November.	CTS
	The calibrator, zero air generator, reference gases and laboratory items must be transferred from Tebbin before Sunday 23 November.	MN
3.	**Training**	
	Documentation: Status CTS' training instructions.	CTS
	Training: Common lecture for Monitoring lab., Reference lab. and Monitoring lab. Alex. On the job training will be done at Monitoring lab. and Reference lab. separately. Status/ details?	CTS
4.	**Status Stations**	
	Tebbin: In operation. One cylinder of silica gel has been borrowed from the storage. Silica gel must be procured as soon as possible.	LM
	Monitoring Lab: Installation finalised. Some calibrations missing.	
	Computer Center: Not installed yet.	
	Reference Lab: Not installed yet. Instruments transferred.	
	El Gomhoroya street: Not installed yet.	
	Giza Cairo University: Not finalised yet. The following equipment is transferred: SO2 and NO travelling gas standards. The NO cylinder has too high concentration (5 ppm, should be 0.8 ppm). They will be used for weekly zero/ span checks.	
5.	**Status Instruments**	
	SO2 monitor: SO2 monitor with non-linear response has been checked. OK. Problem probably due to humidity in zero air compressor.	CTS/LM
	One SO2 permeation tube (tebbin station) is damaged. Bad storage temp?	CTS
6.	**Other matters**	
	Met. towers: The 12 m towers are not foldable. Kontram sug-	

	gests climbing the tower using safety equipment. Prices for foldable segment should be checked.	LM
	Data logger: CTS has provided a list of data logger codes.	CTS
	Floppy disk error on EMC upgrade diskette.	CTS
	List of items: We need a complete list of items used for installing Tebbin station but not included in the delivery.	CTS
	Visits to CTS: • Harri Granath. expert from Kontram. He checked the Tebbin station and helped installing the Monitoring lab, especially the HC monitor. • Expert from Thermo Environmental arrives 3 Nov. • Jarmo Kiukainen, sales rep. from Kontram did not arrive 15 Oct., 5 days. • Bill Hayes, expert from EMC (data logger) arrives in November.	
	Seminar Tebbin: The Tebbin station was officialy opened during the seminar by the Minister of Environment on Monday 27 October. The event was covered in TV and newspapers.	BS/MN
	The workshop on air pollution was held from Tuesday 28 - Thursday 30 October. Positive response. Many questions.	BS/LM

Minutes of Meeting Ambient air monitoring

Subject: Weekly planing meeting

Date: 97.11.02

Place: EIMP

Participants: T. El Araby (Cairo Univ.), Aly Hamed(CTS) - day after, M. Nassar (EEAA), B. Sivertsen (EIMP), L. Marsteen (EIMP)

Prepared by: LM/

Distribution: T. El Araby, A. El Sueini, M. Nassar, L. Marsteen, B. Sivertsen, M. Fathy, J. Hassing

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Next meeting: Sunday 9 November 14:30 at EIMP office

		Init.
1.	**Infrastructure:** The responsibility of EEAA CTS should visit the site before installation starts to see that everything is in order. A split unit air cond. will be preferred at the stations - only a small hole in the wall. El Sueni: Split unit - Le 3000, usual - Le 2200.	
2.	**New installations**	
	Tebbin: Finalised Wednesday 22 October.	CTS
	The PM10 monitor reported power failure Sunday 2 November. According to CTS the monitor 'looses memory' and must be reprogrammed if the power is off too long. Short battery backup.	CTS
	PM10 monitor flow was calibrated using the included flow calibration unit. CTS will provide results for the next meeting.	CTS
	Status list of serial numbers? On its way.	CTS
	Dr. Said at Tebbin will not release any equipment before the seminar is paid. Must be fixed by Tuesday 4 November.	MN
	Monitoring Laboratory: The HC, CO and NOx monitors have not been calibrated. The calibration will take place Wednesday 5 - Thursday 6 November. EEAA must temporarily transfer the reference gases from Tebbin to the University before Wednesday 5 November.	CTS MN
	The O3 monitor has not been calibrated, O3 calibrator at NIS.	

	The car has arrived at Tebbin. It awaits registration.	
	What gas cylinders have been ordered for Monitor lab?	LM/ Anwar MN
	Computer Center: El Zarka's signature for transfere was obtained on Sunday 2 November.	
	CTS has reported a software failure on the Computer Center PC. This may not be solved until Wednesday 12 November when a specialist from EMC will visit CTS.	EMC/ CTS
	The instrumentation will be transfered on Sunday 16 November.	MN
	The installation will start Monday 17 November. It must be finalised before the big opening on Thursday 20 November.	EMC/ CTS
	Cairo University station: The University requests to have the station installed by Thursday 20 November - big opening.	TA
	CTS will finalise the installation Sunday 9 - Tuesday 11 November.	CTS
	The met. tower will be installed later - new signal cables will be necessary. Who will prepare and provide the holes, bolts and concrete?	MN/TA
	The air cond. is still missing. It wil be ordered on Monday 3 November. It must be installed after Tuesday 11 November but before the opening.	MN/ Anwar
	El Gomhoroya street: The test installation will be rigged at Tebbin after finalising the Cairo University station. The installation will take place between Sunday 16 and Saturday 22 November. Calibrations will be done using the Ref. lab. calibrator and gases.	CTS
	The SO2 and NO reference gases must be transferred from the Monitoring lab. to Tebbin before Sunday 16 November.	MN
	The station will be installed after finishing the installations at the Ref. lab. is finalised. Installations should preferably start before Sunday 7 December.	CTS
	Reference Laboratory: Calibrator, zero air generator, reference gases and laboratory items are not transferred.	
	The PM10 monitor and air intake incl. manifold will not be transferred as it is not necessary at the Ref. lab.	
	The test installation will be rigged at NIS after finalising the Gomhoroya test installation at Tebbin. It will start on Sunday 23 November and last for at least two weeks.	CTS
	The calibrator, zero air generator, reference gases and laboratory items must be transferred from Tebbin before Sunday 23	MN

	November.	
3.	**Training**	
	Documentation: Status CTS' training instructions.	CTS
	Training: Common lecture for Monitoring lab., Reference lab. and Monitoring lab. Alex. On the job training will be done at Monitoring lab. and Reference lab. separately. Status/ details?	CTS
4.	**Status Stations**	
	Tebbin: In operation. One cylinder of silica gel has been borrowed from the storage. Silica gel must be procured as soon as possible. MN will check availability in Egypt and buy some.	MN/ Anwar
	Monitoring Lab: Installation finalised. Some calibrations missing. Will be done this week.	CTS
	Computer Center: Not installed yet.	
	Reference Lab: Not installed yet. Instruments transferred.	
	El Gomhoroya street: Not installed yet.	
	Giza Cairo University: Not finalised yet. The following equipment is transferred: SO2 and NO travelling gas standards. The NO cylinder has too high concentration (5 ppm, should be 0.8 ppm). They will be used for weekly zero/ span checks.	
5.	**Status Instruments**	
	PM10 monitor, air intake too short, must buy new. CTS will check prices and possibility of returning received intake	CTS
	Longer signal cables for the met. stations, CTS checks prices.	CTS
	According to Harri Granath, Kontram, the SO2/NO2 permeation tube calibration unit requires one more air intake manifold solenoid valve (total of 3) to operate correctly. CTS has contacted Kontram and Thermo. Status?	CTS/LM
	Gas cylinder regulator for N2 carrier gas (HC monitor) has a specified max inlet pressure of 40 bar. N2 cylinder has more then 100 bar.	CTS
	Gas cylinder regulator for N2 carrier gas has flexible tube output connection not standard swagelok. Not suiteable for high pressure.	CTS
6.	**Other matters**	
	Met. towers: The 12 m towers are not foldable. Kontram suggests climbing the tower using safety equipment. Prices for foldable segment should be checked.	LM

	Floppy disk error on Station Manager EMC upgrade diskette. New diskette received.	CTS
	List of items: We need a complete list of items used for installing Tebbin station but not included in the delivery.	CTS
	Visits to CTS: • Expert from Thermo Environmental arrives Saturday 8 Nov. • Bill Hayes, expert from EMC (data logger) arrives Wednesday 12 November.	
	SUMMARY TIME SCHEDULE:	
	4 November: Transfere of HC, CO, NOx and SO2 reference gases from Tebbin to Monitoring lab.	MN
	5 - 6 November: Calibration of HC, CO and NOx monitors at Monitoring lab.	CTS
	9 - 11 November: Finalisation of Cairo University station including calibration of NOx and SO2 monitors	CTS
	12 November - before 20 November: Installation of air cond. at Cairo University station	MN
	12 - 15 November: Fixing software in System manager PC at Tebbin	CTS/ EMC
	16 November: Transfere of Computer Center instrumentation from Tebbin to Monitoring lab.	MN
	17 - 20 November: Installation of Computer Center at Monitoring lab.	CTS/ EMC
	12 November - before 16 november: Transfere of HC, CO, NOx and SO2 reference gases from Monitoring lab. to Tebbin.	MN
	16 - 22 November: Test installation of El Gomhoroya street station at Tebbin.	CTS
	23 November: Transfere of calibrator equipment and reference gases from Tebbin to Ref. lab.	MN
	23 November - 4 December: Test installation at NIS (Ref. lab.)	CTS
	7 December: Transfere of instruments from Tebbin to the El Gomhoroya station	MN
	8 December: Installation of El Gomhoroya station starts.	CTS

Minutes of Meeting Ambient air monitoring

Subject: Weekly planing meeting

Date: 97.11.09

Place: EIMP

Participants: T. El Araby (Cairo Univ.), H. El Araby (Cairo Univ.), A. El-Soueni (CTS), M. Nassar (EEAA), B. Sivertsen (EIMP), L. Marsteen (EIMP)

Prepared by: LM/

Distribution: T. El Araby, A. El Sueini, M. Nassar, L. Marsteen, B. Sivertsen, M. Fathy, J. Hassing

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Next meeting: Sunday 16 November 14:30 at EIMP office

		Init.
1.	**Infrastructure:** The responsibility of EEAA	
	CTS should visit the site before installation starts to see that everything is in order.	
	A split unit air cond. will be preferred at the stations - only a small hole in the wall is needed. El Sueni checked the prices and has indicated for Cairo University Le 3300,-.	CTS
2.	**New installations**	
	Tebbin: Finalised Wednesday 22 October.	CTS
	The PM10 monitor stops at random. Thermo specialist will investigate problem this week. CTS wants to start all monitors in parallell at Tebbin. They can do it but without altering the time schedule.	CTS/ Thermo
	Results from flow calibration of PM10 monitor is still missing.	CTS
	List of serial numbers? Still on its way.	CTS
	Monitoring Laboratory: All monitors except the O3 monitor has been calibrated. EIMP are waiting for documentation of calibrations. EEAA transfered temporarely gas cylinders from Tebbin to the University according to schedule.	CTS MN
	The car has arrived at Tebbin. It awaits registration.	
	What gas cylinders have been ordered for Monitor lab? None according to Anwar. Will be ordered as part of second delivery.	LM/ Anwar
	CTS will install the portable met. station at the top floor at Tebbin. When?	CTS

	CTS will check the University's SO2 and NO reference gas cylinders.	CTS
	Computer Center: CTS has reported a software failure on the Computer Center PC. This may not be solved until Wednesday 12 November when a specialist from EMC will visit CTS.	CTS/ EMC
	The instrumentation will be transfered to the Computer Center on Sunday 16 November.	MN
	The installation will start Monday 17 November. It must be finalised before the big opening on Thursday 20 November.	EMC/ CTS
	Cairo University station: The University requests to have the station installed by Thursday 20 November - big opening.	CaUni
	CTS will finalise the installation Sunday 9 - Tuesday 11 November.	CTS
	The air cond. has been ordered, Le 3300. It must be installed after Tuesday 11 November but before the opening.	MN/ Anwar
	In a meeting at Cairo University Tuesday 11 November it was decided that the met. tower will be placed on the roof of the Monitoring Lab. The University will be responsible for all sivil works including erecting the tower. CTS will install the met. sensors if possible before Thursday 20 November. No calibration or connection of sensors to the data logger will be undertaken during this period.	CaUni/ CTS
	El Gomhoroya street: The test installation will be rigged at Tebbin after finalising the Cairo University station. The installation will take place between Sunday 16 and ~~Saturday 22~~ November. Calibrations will be done using the Ref. lab. calibrator and gases.	CTS Monday 24 NOV.
	The SO2, NO, HC and CO reference gases must be transferred from the Monitoring lab. to Tebbin before Sunday 16 November.	MN
	The station will be installed after the installations at the Ref. lab. are finalised. Installations should preferably start before Sunday 7 December.	CTS
	Reference Laboratory: All equipment except calibrator, zero air generator, reference gases and laboratory items are not transferred.	
	The PM10 monitor and air intake incl. manifold will not be transferred as it is not necessary at the Ref. lab.	
	The test installation will be rigged at NIS after finalising the Gomhoroya test installation at Tebbin. It will start on Sunday 23 November and last for at least two weeks.	CTS
	The calibrator, zero air generator, reference gases and labora-	

	tory items must be transferred from Tebbin before Sunday 23 November.	MN
	Training	
3.	**Documentation:** Status CTS' training instructions? Instructions in English has to be made available before 5 December.	CTS
	Training: Wednesday 10 December: Common lecture for Monitoring lab., Reference lab. and Monitoring lab. Alex.	CTS
	After 15 January: On the job training. Status/ details?	CTS
4.	**Status Stations**	
	Tebbin: In operation. Three cylinders of silica gel has been borrowed from the storage. Silica gel must be procured as soon as possible. Only large amounts avaliable in Egypt. Must be procured as soon as possible.	MN/ Anwar
	Monitoring Lab: Installation finalised except for the air intake and manifold. All monitors except for the O3 monitor have been calibrated.	CTS
	Computer Center: Not installed yet.	
	Reference Lab: Not installed yet. Instruments transferred.	
	El Gomhoroya street: Not installed yet.	
	Giza Cairo University: Not finalised yet. The following equipment is transferred: SO2 and NO travelling gas standards. The NO cylinder has too high concentration (5 ppm, should be 0.8 ppm). They will be used for weekly zero/ span checks. Will be procured in second delivery	
5.	**Status Instruments**	
	PM10 monitor: air intake too short. must buy new. CTS will check prices and possibility of returning received intakes.	CTS/ Thermo
	Met. towers: The 12 m towers are not foldable. Kontram suggests climbing the tower using safety equipment. CTS will check prices for foldable segment/ sensor lift on rails, 6 weeks delivery time.	CTS
	Longer signal cables for the met. stations, CTS checks prices, approx. $10/m, 3-4 weeks delivery time. It is possible to extend cables using a junction box. CTS has already ordered 200m.	CTS
	TEI 145: According to Harri Granath, Kontram, the SO2/NO2 permeation tube calibration unit requires one more air intake manifold solenoid valve (total of 3) to operate correctly. Will be investigated by Thermo specialist. **Latest:** A solenoid valve was missing inside TEI 145. CTS will fix all TEI 145s.	CTS/LM Thermo

	Gas cylinder regulator for N2 carrier gas: Has a specified max inlet pressure of 40 bar. N2 cylinder has more then 100 bar. CTS has ordered new regulators.	CTS
	Gas cylinder regulator for N2 carrier gas has flexible tube output connection not standard swagelok. Not suiteable for high pressure.	CTS
	Calibration kits for HiVol samplers: 3 pcs have arrived in Cairo.	CTS MN
6.	**Other matters**	
	List of items: We need a complete list of items used for installing Tebbin station but not included in the delivery.	CTS
	Questions to Kontram/CTS: A letter was sent to both Kontram and CTS containing severel questions regarding installations and equipment. Some of the questions were answered in a meeting with CTS Tuesday 11 November.	LM
	Visits to CTS: • Frank Ducket, expert fom Thermo Environmental arrives Saturday 8 Nov. • Bill Hayes, expert from EMC (data logger) arrives Wednesday 12 November. → Env. Monitoring Company	

SUMMARY TIME SCHEDULE:	
This time schedule has been approved by CTS, EIMP and EEAA. Any changes to the schedule shall be coordinated by the Air quality part of EIMP.	All
4 November: Transfere of HC, CO, NOx and SO2 reference gases from Tebbin to Monitoring lab.	MN
5 - 6 November: Calibration of HC, CO and NOx monitors at Monitoring lab.	CTS
9 - 11 November: Finalisation of Cairo University station including calibration of NOx and SO2 monitors	CTS
12 November - before 20 November: Installation of air cond. at Cairo University station	MN
12 - 15 November: Fixing software in System manager PC at Tebbin	CTS/ EMC
16 November: Transfere of Computer Center instrumentation from Tebbin to Monitoring lab.	MN
17 - 20 November: Installation of Computer Center at Monitoring lab.	CTS/ EMC
12 November - before 16 november: Transfere of HC, CO, NOx and SO2 reference gases from Monitoring lab. to Tebbin.	MN
16 - 22 November: Test installation of El Gomhoroya street station at Tebbin.	CTS
23 November: Transfere of calibrator equipment and reference gases from Tebbin to Ref. lab.	MN
23 November - 4 December: Test installation at NIS (Ref. lab.)	CTS
7 December: Transfere of instruments from Tebbin to the El Gomhoroya station	MN
8 December: Installation of El Gomhoroya station starts.	CTS
10 December: Training, theoretical background	CTS
14 Januar 1998: El Gomhoroya station installed	CTS
15 Januar: Training, Practical - on the job	CTS

EIMP

Minutes of Meeting Ambient air monitoring

Subject: Weekly planing meeting

Date: 97.11.16

Place: EIMP

Participants: T. El Araby (Cairo Univ.), Aly Hamed (CTS), M. Nassar (EEAA), B. Sivertsen (EIMP), L. Marsteen (EIMP)

Prepared by: LM/

Distribution: T. El Araby, A. El Sueini, M. Nassar, L. Marsteen, B. Sivertsen, M. Fathy, J. Hassing

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Next meeting: Sunday 23 November 14:30 at EIMP office

		Init.
1.	**Infrastructure:** The responsibility of EEAA CTS should visit the site before installation starts to see that everything is in order.	
2.	**New installations**	
	Tabbin: Finalised Wednesday 22 October.	CTS
	CTS had programmed the PM10 monitor to advance the filter at 15 minutes past the hour. According to Duckett of Thermo this time setting causes the monitor to stop automatically at midnight. (Did not happen every time though!). The Tabbin monitor will run in parallel with one other monitor for some time.	CTS/ Thermo
	Results from flow calibration of PM10 monitor is still missing.	CTS
	List of serial numbers? LM will collect them at Tabbin.	LM
	Monitoring Laboratory: Documentation of calibrations?	CTS
	The portable met. station will be installed at the top floor at Tabbin during the test installation of the Gemhoroya station.	CTS
	MN will pick up the printout from the PM10 monitor on Monday 17 November.	MN
	The car has arrived at Tabbin. It awaits registration.	
	Computer Centre: The System Manager software problem is solved. The system was programmed for tone dialling while the Tabbin telephone system is pulse based.	CTS/ EMC
	The test installation at Tabbin is finalised. It will be checked by	LM/BS/

	EEAA/EIMP on Monday 17 November.	MN
	The instrumentation will be transferred to the Computer Centre on Monday 17 November.	MN
	The installation will start Monday 17 November.	CTS
	The Monitoring lab. PC and the two PCs at the Computer centre will be equipped with 3Com Ethernet cards.	CaUni
	According to CTS there are two System Manager installations (2 PCs) at Tabbin. Originally two was specified but it was reduced to one System Manager and one extra PC with MS Office. This must be checked.	LM/ Anwar
	Cairo University station: CTS will on Monday 17 November provide a drill for CaUni for making the hole in the wall for the air intake. The hole will be made on Tuesday 18 November.	CTS CaUni
	The NOx and SO2 monitors and working gas cylinders will be calibrated on Tuesday 18 November.	CTS
	CTS will install the monitors at the station and finalise the installation on Wednesday 19 November.	CTS
	The air cond. has been ordered, Le 3300. It must be installed before the opening.	MN/ Anwar
	The met. tower will be placed on the roof of the Monitoring Lab. If the met tower is raised before Thursday 20 November the University will be responsible for all civil works including erecting the tower. CTS will install the met. sensors if possible before Thursday 20 November. No calibration or connection of sensors to the data logger will be undertaken during this period.	CaUni CTS
	CTS has still not provided CaUni with the specifications for preparing the foundations for the met. tower	CTS
	El Gemhoroya street: The test installation has been rigged at Tabbin. The installation will be finalised on Monday 24 November. Calibrations will be done using the Ref. lab. calibrator and gases.	CTS
	The SO2, NO, HC and CO reference gases must be transferred from the Monitoring lab. to Tabbin on Wednesday 19 November.	MN
	The station will be installed after the installations at the Ref. lab. are finalised, preferably on Sunday 14 December.	CTS
	Reference Laboratory: The test installation will be rigged at NIS. It will start on Sunday 23 November and last for at least two weeks.	CTS
	The calibrator, zero air generator, reference gases and laboratory items all of which will be installed last will be transferred	MN

	from Tabbin after the Gemhoroya test installation has been finalised.	
3.	**Training**	
	Documentation: Status CTS' training instructions? Instructions in English has to be made available before Friday 5 December.	CTS
	Training: Between Sunday 7 and Wednesday 10 December there should be some training on the System manager.	CTS
	Wednesday 10 December: Common lecture for Monitoring lab., Reference lab. and Monitoring lab. Alex.	CTS
	After 15 January: On the job training. Status/ details?	CTS
4.	**Status Stations**	
	Tabbin: In operation. Three cylinders of silica gel has been borrowed from the storage. Silica gel must be procured as soon as possible.	MN/ Anwar
	Monitoring Lab: Installation finalised except for the air intake and manifold. The HC monitor must be shut off immediately due to wrong type of N2 gas cylinder regulator.	CTS
	Computer Centre: Not installed yet.	
	Reference Lab: Not installed yet. Instruments transferred.	
	El Gemhoroya street: Not installed yet.	
	Giza Cairo University: Installation will be finalised this week.	
5.	**Status Instruments**	
	PM10 monitor: Air intake too short. CTS will check prices and possibility of returning received intakes.	CTS
	Met. towers: The 12 m towers are not foldable. Kontram suggests climbing the tower using safety equipment. CTS will check prices for foldable segment/ sensor lift on rails, 6 weeks delivery time.	CTS
	Longer signal cables for the met. stations, CTS checks prices, approx. $10/m, 3-4 weeks delivery time. It is possible to extend cables using a junction box. CTS has already ordered 200m.	CTS
	Gas cylinder regulator for N2 carrier gas: Has a specified max inlet pressure of 40 bar. N2 cylinder has more then 100 bar. CTS has ordered new regulators. Output connection?	CTS
	Flow calibration kits for HiVol samplers: 3 pcs have arrived in Cairo.	MN/ Anwar

6.	**Other matters**	
	List of items: We need a complete list of items used for installing Tabbin station but not included in the delivery.	CTS
	Questions to Kontram/CTS: Waiting for answer to our letter.	CTS
	Visits to CTS:	
	• Jarmo Kiukainen from Kontram Denmark arrives this week	
	SUMMARY TIME SCHEDULE:	
	This time schedule has been approved by CTS, EIMP and EEAA. Any changes to the schedule shall be co-ordinated by the Air quality part of EIMP.	All
	4 November: Transfer of HC, CO, NOx and SO2 reference gases from Tabbin to Monitoring lab. **Done OK.**	MN
	5 - 6 November: Calibration of HC, CO and NOx monitors at Monitoring lab. **Done OK.**	CTS
	18 November: Make hole in the wall for air intake at Cairo University station.	CaUni
	18 - 19 November: Finalisation of Cairo University station including calibration of NOx and SO2 monitors. Planned: 11 November.	CTS
	17 - 19 November: Installation of met. tower at Cairo University station. Mounting of sensors.	CaUni/ CTS
	Before 20 November: Installation of air cond. at Cairo University station	MN
	12 - 15 November: Fixing software in System manager PC at Tabbin. **Done OK.**	CTS/ EMC
	17 November: Check Computer Centre test installation at Tabbin.	LM/BS/ MN
	17 November: Transfer of Computer Centre instrumentation from Tabbin to Monitoring lab. Planned: 16 November.	MN
	17 - 19 November: Installation of Computer Centre at Monitoring lab.	CTS/ EMC
	19 November: Transfer of HC, CO, NOx and SO2 reference gases from Monitoring lab. to Tabbin. Planned: Before 16 November.	MN
	16 - 24 November: Test installation of El Gemhoroya street station at Tabbin. Planned: Finished by 22 November.	CTS

	23 November - 4 December: Test installation at NIS (Ref. lab.)	CTS
	26 November: Transfer of calibrator equipment and reference gases from Tabbin to Ref. lab. Planned: 23 November.	MN
	5 December: Training documentation/ instructions must be available.	CTS
	7 - 10 December (one day): Training on System manager.	CTS
	10 December: Training, theoretical background.	CTS
	14 December: Transfer of instruments from Tabbin to the El Gemhoroya station.	MN
	15 December: Installation of El Gemhoroya station starts.	CTS
	14 January 1998: El Gemhoroya station installed	CTS
	15 January: Training, Practical - on the job	CTS

EIMP

Note

Subject: **Air Quality Monitoring**

Date: 4.12.1997

To: Mohammed Nassar

Copy: LM, JMH

From: B Sivertsen

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Tasks for Phase 3 of the EIMP Air Quality Monitoring Component

Several tasks will have to be undertaken by the Task Manager counterpart, M Nassar, as a preparation of Phase 3 of the project.

1. Measurement sites will have to be prepared including:
   - cleaning
   - drilling of holes,
   - installation of shelves and benches, etc....
2. Gemhorya station has to be installed, intake structure designed and produced,
3. Shelters have to be ordered and purchased for Alexandria and for the future monitoring stations. The decision has been made to construct the shelters in wood painted white outside,
4. Air Condition Systems have to be ordered and installed
5. Prepare agreements with site owners if necessary, to be discussed with Dr ElZarka,
6. Agreement with the Meteorological Authorities has to be prepared,
7. Shelves and benches for the Monitoring Laboratory has to be ordered (ASAP),
8. Investigate and order communication lines for the monitoring stations,
9. Prepare input for operational costs for Phase 2 and Phase 3,
10. Prepare payment to the Monitoring Institutions for Phase 2,
11. Participate in Introduction Seminar on monitors and monitoring,
12. Evaluate and discuss the data retrieved at the Computer Centre at the Monitoring Laboratory,
13. Follow up High Volume sampling at Tabbin undertaken by CEHM personnel,
14. Check procedures for gravimetric analyses at Chemical Lab. CEHM, a new balance should be obtained to weigh High Volume sampler filters,
15. Finalise site visits to Assyut and NagaHammadi.

Due to delay in the operation of the System Manager at the Monitoring Laboratory, it has not been possible to start training in the quality control and evaluation of air quality data from the first monitoring stations. For this reason the Task Manager may visit Cairo already in February 1998.
Further developments of operational procedures and analytical procedures will be developed in Phase 3.

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Memo

To: **Amr ElSoueini**
Copy: **M Nassar, L Marsteen, T ElAraby, J Hassing**
From **Bjarne Sivertsen**
Date: **4 December 1997**

Installation, equipment and inadequate deliveries

Based upon meetings at the EIMP Monitoring Laboratory et CEHM, Cairo University, and evaluation of the air quality data collected until 1 December 1997, we have developed a list of tasks, which will have to be undertaken as soon as possible.

The Task Manager, Bjarne Sivertsen and the Monitoring Specialist Leif Marsteen will be out of Egypt from 9 December 1997 to the end of January 1998. It is thus important that all tasks described in this Memo and in the Minutes of Meetings from the Air Quality Monitoring Staff will be undertaken according to time schedules.

The installation programme has been delayed due to various reasons.

As of 3 December 1997 :

- The System Manager at CEHM is not performing properly,
- the Station Manager at CEHM and at Tabbin is not functioning well,
- the three PM_{10} monitors tested and operated are still not properly calibrated and the mechanical operation should be improved,
- PM_{10} monitor manual for CEHM is not available,
- the PM_{10} monitor data at CEHM can not be retrieved (not installed?) in the Station Manager and
- the specification of Meteorological tower base for CEHM has not been supplied.

To have the installations by the supplier at CTS finalised according to procurement specifications we suggest that

The following task will be undertaken:

1. New soft ware at the data retrieval (System Manager) at CEHM will be installed. (ASAP)

2. The monitoring station at Cairo University (Giza CU, site AQ 11) has to be finalised, calibrated and in operation before 9 December 1997.

3. CEHM personnel has to be trained in the operation of the Giza CU station including data retriaval via the Odessa data logger. (before 10 December 1997).

4. The Station Manager at CEHM has to be checked and upgraded (before 10 December 1997)

5. An expert from the System Manager supplier, Environmental Monitoring Company (EMC), will have to visit CEHM to check and upgrade the system and to train the experts at CEHM to (at least) undertake the following operation :

   a) retrieve data from the stations via diskettes and to install these data in the System manager,
   b) to retrieve data via the Odessa logger, or to modify the data retrieval from the Giza CU site
   c) to retrieve data via telephone lines,
   d) to undertake QC/QA and modify, change and correct data for a final data base,
   e) to use the graphical tools properly; scaling, time series with variable length etc..

   The training specified in pt.5) should be given directly to the CEHM personnel and be finalised no later than 20 December 1997.

6. The training seminar to be given by Amr El-Soueini will be held on 10 December at CEHM Cairo University. Complete documentation and manuals will be handed out to all participants. The Seminar will be evaluated.

7. The PM_{10} monitors delivered by Thermo Environmental have to be checked and calibrated properly. The calibration has to be documented and reported and the staff at CEHM have to be trained to operate the instrument properly.

Further details concerning tasks and duties are given in the Minutes of Meeting of the Air Quality Monitoring staff (97.11.16 and 97.11.23)

The calibration of monitors and training in calibration at the Reference Laboratory at NIS should be finalised before 7 December 1997.

The instruments for Gemhoroya station were supposed to be transferred from Tabbin on 14 December 1997. Installation and calibration should be finalised before the end of December 1997!

On-the-job training have been initiated by the Monitoring Expert for operation of the Tabbin site. Training should also start at Gemhoroya station by experts from CTS during the month of January 1997.

Concerning Warranty

In all procurement documents a warranty period of one year should be specified by the Supplier. In this context the warranty should run from the date of installation and or beginning of operation of the equipment.

In the Terms of bid from Kontram a warranty of twenty four (24) months from the date of the shipment was specified.

Based on the experience gained in Egypt including the 6 months delay due to permissions to release the equipment from Custom Authorities, it will be necessary to modify or to make an addendum to the warranty period. Also, it is clear after the detailed time planning of installations, the time schedule for installations of the equipment in Egypt will cover a period of at least 22 months from the start of installation in October 1997.

We thus propose that:

The warranty period is 24 months from the shipment, as indicated in the Terms of Bid, and that in addition a guarantee period for the performance of instruments of 12 months from the date of installation is accepted.

Appendix L

Annual Plan for EIMP Phase 3 and Staff Input Schedule 1998

4. Air Pollution Monitoring

4.1. Updated revised logical framework matrix 1998

The LFA matrix for the air pollution monitoring component is presented below as Exhibit 4.1

Exhibit 4.1 - Revised LFA for air pollution monitoring

Outputs for air pollution monitoring component, Phase 3:				
Project Document		**Extended Description**		**Verifiable Indicators**
4	Training of EEAA staff in interpretation of monitoring finalised	**A.** A.1 A.2 A.3	**Institutional support** Working group meetings held Contract between EEAA and monitoring institution continued Counterpart trained	
3	Monitoring programme adjusted based on evaluation	**B.** B.1 B.2	**Design of monitoring programme** Existing monitoring stations and data evaluated Monitoring programme designed	
		C. C.1 C.2	**Procurement of equipment, hardware and software** Equipment, hardware and software specified Monitoring equipment procured and installed	
		D. D.1 D.2 D.3	**Data management** Data management system designed Local data bases at Monitoring Laboratory EEAA data base installed	

Training courses	**E. Training** E.1 Training needs assessed for Phase 3 E.2 Programme prepared E.5 Data base training E.6 Chemical analyses training	
5 Preliminary QA/QC introduced at monitoring institutions	**F QA/QC** F.2 Standard operations procedures (SOPs) and QA/QC manuals prepared F.3 On the job QC/QA training procedures F.4 QA input from Reference laboratory	
2. Permanent sites and first cycle of monitoring sites are monitored 1. First preliminary yearly report on the state of ambient air quality	**G. Monitoring** G.1 Plans for 1999 G.2 Monitoring programme G.3 Monitoring stations installed G.4 Air Quality Monitoring G.5 Data evaluation G.6 Chemical analyses G.7 Reporting	
	H. Reference Laboratory H.2 Support training for Reference Laboratory. Personnel H3. Audits and controls	
	I. Component Co-ordination I.1 Planning I.2 Management I.3 Reporting	

Exhibit 4.1 - Revised LFA for air pollution monitoring (continued)

Activities for air pollution monitoring component, Phase 2		
Project Document	**Extended Description**	**Verifiable Indicators**
1.2 Training of EEAA staff on interpretation and reporting of data	**A. Institutional support** A.1.1 Air pollution monitoring working group (APMWG) A.2.2 Assist in describing work functions for new experts A.3.1 Counterpart trained during development of the programme	• Minutes of meeting • • On the job training and reporting
3. Revision of monitoring schedule	**B. Design of monitoring programme** B.1.1 Evaluate existing measurement sites B.2.1 Select representative monitoring sites for air quality measurements, work continued . B.2.2 Define site characteristics B.2.5 Select sites for meteorological measurements at some of the AQ sites B.2.8 Establish agreements with monitoring site owners	• Site description report • Site description report • Monitoring programme report • Agreements available
	C. Procurement of equipment, hardware and software C.1.1 Evaluate existing equipment C.2.1 Procure instruments and equipment C.2.2. Prepare instruments for installation	• Instruments available
	D. Data Management D.1.1 Specify data collection and data transfer D.1.2 Specify data retrieval and local data base at Monitoring Laboratory D.1.3 Specify data quality check and control procedures D.1.4 Identify sources for supplementary data D.1.5 Telecommunication established	• Specification report • Report and manuals • Manuals Mission Report •

Exhibit 4.1 - Revised LFA for air pollution monitoring (continued)

		D. Data Management	
		D.2.1 Prepare database for manual analysed data from sequential and hivol samplers	• Data base at Monitoring Laboratory
		D.2.2. Establish local databases for monitors at Monitoring Laboratory	• Local database available
		D.3.1 EEAA data base , AirQUIS installed	
		E. Training	
		E.1.1 Assess training needs for Phase 3	• Training plan • Training programmes and preliminary schedules described.
		E.2.1 Prepare on-the-job training	
		E.2.2 Prepare training programme for instrument maintenance, calibration and data collection	
		E.2.3 On-the-job training at Reference Laboratory and on Monitoring Laboratory	• Training on its way
		E.2.4 Support training to Reference Laboratory	
4.	Training of EEAA staff in reporting and interpretation	E.5.1 Use of data base at System Manager	
		E.5.2 Training in use of EEAA data base	• Quarterly reports
		E.6.1 Sample preparations	
		E.6.2 Chemical analyses of various filter samples	• Filters analysed
		F QA/QC	
		F.2.1 Specify instrument calibration procedures	• Manuals
5	Introducing preliminary QA/QC procedures	F.2.2 Design quality control and quality assurance procedures at Monitoring Laboratory	• Manuals • Written SOPs
		F.2.3 Establish Standard Operational Procedures (SOP) as part of QA/QC	
		F.3.1 QC and calibration routines as part of on-the-job training	• Quality check schemes developed and used
		F.4.1 Input QA from Reference Laboratory Air	

Exhibit 4.1 - Revised LFA for air pollution monitoring (continued)

2	Monitoring permanent sites and first cycle	**G. Monitoring** G.1.1 Prepare work plan for 1999 activities G.2.1 Specify sampling programme procedures G.2.2 Specify monitoring programme procedures G.2.3 Start monitoring programme and data retrieval G.3.1 Update monitoring station infrastructures in Cairo and Alex G.3.2 Install monitors in Cairo and Alexandria G.3.3 Start monitoring in Delta and Upper Egypt G.4.1 Maintenance and calibration G.4.2 Service and repair G.5.1 Data retrieval and data evaluation G.5.2 Data presentation G.6.1 Sample preparation G.6.2 Chemical analyses G.7.1 Quarterly reports G.7.2 Annual reports	• Report with work plan for 1999 • Monitoring programme • First data collected, evaluated and reported • Monitoring stations prepared • Field reports • First data report • Quarterly reports • Annual reports
1.1	Writing of report based on monitoring results from phase 2 combined with "old" material		
		H. Reference Laboratory H.2.1 Training of Reference Laboratory personnel in use of monitors and calibration H.3.1 Check field monitors H.3.2 Audit programme	• Calibration certificates • Reference Laboratory experts trained
		I Component Co-ordination I.1.1 Annual plan 1999 I.2.1 Follow up, meetings and administration I.3.1. Annual report	

1.1 A. Institutional support and co-ordination

1.1.1 Activity A.1.1 Air Pollution Monitoring Working Group (APMWG)

The first working group meeting was held in October 1996.

The participants in the working group will have to be changed as a result of alterations in the air quality monitoring programme including changes in monitoring institutions.

Further working group meetings may be held when the instruments have been installed in Cairo and Alexandria. There is at present no need for input from the Working Group.

Discussions of details concerning the duties and responsibilities of the Monitoring Institution's functions will be held, and the support of relevant expertise to the monitoring laboratory will be discussed.

1.1.2 Activity A.2.2 Assist in describing work functions for new experts

In addition to the earlier prepared job descriptions, the work to be undertaken by the new experts to be engaged by the monitoring institution will be described.

1.2 B. Design of monitoring programme

1.2.1 Activity B.1.1 Evaluate existing measurement sites

Existing measurement sites will be further evaluated. Some of the measurement sites used by Meteorological Authority and Atomic Energy Authority could be used by the EIMP programme. The results of all evaluations will be presented in the siting reports.

1.2.2 Activity B.2.1 Select representative monitoring sites for air quality measurements

Further investigations concerning a few sites outside Cairo and in Alexandria will have to be re-visited. At some areas in the Delta and in Upper Egypt details concerning sites will have to be decided. The sites will have to cover different scales of pollution.

1.2.3 Activity B.2.2 Define site characteristics

For each monitoring site the surrounding area, local sources and possible impacts will be described..

The site descriptions will be followed by local maps, co-ordinate specifications and photos where available. A site description report will be made.

1.2.4 Activity B.2.5 Select sites for meteorological measurements

Meteorological data on an hourly basis will be needed to interpret the air quality data collected. Wind speeds, wind directions and atmospheric turbulence (stability conditions) are the most important parameters to explain the relationship between the air pollution sources and air quality. These data are essential to understand the pollution impact.

Most of the meteorological sites have been selected. However, the detailed locations have to be reconsidered in the Delta and in Upper Egypt.

1.2.5 Activity B.2.8 Establish agreements with monitoring site owners

It will be necessary to establish some agreements with the site owners about the use of their sites. The responsibility for this work is at the EEAA counterpart Dr Nassar, who is evaluating the needs for agreement at each site. Many of the sites are Governmental buildings. A letter to some site owners has been prepared.

1.3 C. Procurement of equipment, hardware and software

1.3.1 Activity C.1.1 Evaluate existing equipment

Existing equipment already available in Egypt has been evaluated. So far no equipment has been suited for including in the EIMP monitoring programme. The evaluation has been based upon a quality evaluation. This work will continue into the third phase of the programme. Equipment available at the Meteorological and Atomic Energy Authorities has been evaluated. The equipment are of the same type as the EIMP/EEAA instruments. Repairs and calibrations have, however, to be undertaken before included in a future network for Egypt.

1.3.2 Activity C.2.1 Procure instruments and equipment

Technical evaluation of air quality monitoring equipment was undertaken in Phase 2 of the programme. Evaluations for the second and third delivery of equipment will continue in 1998. Equipment procured will be checked and calibrated upon arrival in Egypt.

1.3.3 Activity C.2.2 Prepare instruments for installation

All instruments arrived in Egypt, and stored at Tabbin institute will be checked and verified before transferred to the Monitoring Laboratory. All monitors will then be calibrated prior to the installation in the field.

1.4 D. Data management

1.4.1 Activity D.1.1 Specify data collection and data transfer

Different types of data will be collected by the monitoring programme. The first specification of the data collection procedures were developed in Phase 1. Further specifications of the various forms of data collection procedures will be established in Phase 3.

For air quality data collected by samplers, the various sampling procedures and data collection and analyses procedures will be developed during 1998.

At air quality monitoring stations each site will be equipped with a data logger unit. Hourly average data will be transferred as raw data via modem and telephone lines to the central computer unit, the System manager, at the Monitoring Laboratory. From some of the stations, where communication lines are not available, the data will be collected on floppy disks.

Data will also be made available for the monitoring institution in Alexandria via internet. It will be made possible for ISGR in Alexandria to retrieve data from the Monitoring Laboratory in Cairo on a daily bases, and to look at the data on simple time plots. These plots will be printed weekly and stored for further evaluation.

1.4.2 Activity D.1.2 Specify data retrieval and local data base at Monitoring Laboratory

Details concerning specifications of data scaling, data storage, data quality control etc. will be established based on specifications given in the System Manager. Specifications will be developed and collected in a specification report or in manuals.

Training of expert personnel for this operation at the data retrieval computer will be based upon System Manager specifications. Some of the specifications will be undertaken as an on-the-job effort together with an adviser. Routine control of all data retrieved is essential on an every day basis.

1.4.3 Activity D.1.3 Specify data quality check and control procedures

Data quality controls apply both to the automatic monitoring data and to semi automatic and manually collected data. An initial description of the quality control procedures was prepared during Phase 1.

The Monitoring Laboratory will be equipped with reference gases. Graphical and statistical software to perform daily controls will be supported by the supplier as part of the System manager.

The technical tools will be supported by quality control descriptions , manuals and reporting procedures. Log books will be established for each instrument. The laboratory routine data monitoring, retrieval ,storage and quality control will start as soon as the first instruments are installed. The training will include all participating air quality data collecting institutions as on-the job training.

Manuals and reporting procedures for collected samples analysed in the analytical lab will be developed. This development will take place at the end of 1998. This work will also be done as an on-the-job training effort. As part of the quality controls proficiency tests will be prepared by the Deference Laboratory.

1.4.4 Activity D.1.4 Identify sources for supplementary data

Some available air quality data from Egypt was evaluated in the first phase of the programme. None of these data has a quality adequate for the EIMP/EEAA data base. In a further evaluation of such data we will have to study quality and whether the data are representative for any of the site specifications defined in the programme.

1.4.5 Activity D.1.5 Telecommunication lines

Dr M Nassar had meetings with the National Authority for Communication (NAC) concerning lines for data transfer. NAC have a network for data communication that could be used by EEAA/EIMP for transferring data from the monitoring sites to the central computer at the Monitoring Laboratory. In the future the network can also be used to transfer the data to EEAA. This solution is presently probably the best one available in Egypt. Further investigations and decisions will be taken in 1998.

1.4.6 Activity D.2.1 Prepare database for manually analysed data

A laboratory database for samples that are being prepared for chemical analyses, quality controls and calibration will be considered and prepared during 1998. Preliminary data will be entered into a data base for automatic control. Final data approvals have to be issued before the data are entered into the main data base.

Descriptions and manuals for the use of such chemical data will be prepared for use at the Monitoring Laboratory at the end of 1998.

1.4.7 Activity D.2.2. Local database for monitor data the Monitoring Laboratory

A local data base for the data retrieved from the monitoring system is part of the System Manager. The details and content of this database will depend upon

specifications given by the instrument supplier The specifications will be part of the report and manuals developed for this part of the monitoring centre.

The local database will contain all one-hour average data ; concentrations of gases and particles as well as all meteorological data. These data will be quality assured and controlled in the final version of the local database. The data will represent the basis for the development of quarterly reports and aggregated data transferred to the EEAA database. The frequency and methods for this transfer will have to be decided upon during Phase 3.

1.4.8 Activity D.3.1 EEAA data base

The data base for statistical handling of ambient air quality data and preparation of annual reports is based on the same system as the EEAA emission inventory data base, AirQUIS. The ambient air pollution data base will be established at EEAA at the end of 1998.

1.5 E. Training

1.5.1 Activity E.1.1 Assess training needs for Phase 3

Training needs have been evaluated for the Monitoring Laboratory and the Reference Laboratory Air. Training started in the second phase by seminars and work shops, and will continue mainly with on-the-job training during the third phase. The need for basic training work shops and seminars will be evaluated. Further training programmes will be evaluated and implemented during the installation and operational phase at the end of Phase 3.

1.5.2 Activity E.2.1 Prepare on-the-job training

An important part of the training programme will be based upon on-the-job training. It is essential that the personnel at the Monitoring Laboratory, who will have the responsibility for the future monitoring system, will follow the installations and will be involved in operations of the monitors and samplers as soon as possible in the third phase.

Training has started both at the Reference Laboratory and at the Monitoring Laboratory and will continue into the third and fourth phase. An on-the-job training programme will also be developed for daily instrument checks, calibration and maintenance.

1.5.3 Activity E.2.2 Training programme for instrument operation and maintenance.

The following topics has been included in the training programme for instrument operations and maintenance :

- Instrument installations,
- instrument calibrations,
- control and maintenance,
- data transfer procedures ,
- data retrieval programme,
- data handling at the Monitoring Laboratory,
- data storage and presentation.

The work started in 1997, but the main part of this training will be undertaken during phase 3. An important part of the third phase training programme will be to learn to install and operate the various types of monitors.

1.5.4 Activity E.2.3. On-the-job training at Monitoring Laboratory

On-the-job training will be undertaken for personnel both at the Monitoring Laboratory and at the Reference Laboratory

Concerning the monitoring system training will be undertaken by the instrument supplier and the monitor experts from EIMP (NILU). Local experts or international experts from the suppliers will be contacted if needed.

Training in the installation and use of monitors and in check and controls will be undertaken as a on-the-job training effort at the Monitoring Laboratory after a similar introduction has been undertaken for selected experts at the Reference Laboratory.

Similar training will also be performed for selected experts from the other monitoring institutions. This training will take place with installed instruments in Cairo, and be continued in Alexandria.

Concerning the sampling equipment included in the programme, training in chemical analyses and use of laboratory equipment will be given by NILU experts for personnel at the Monitoring Laboratory. These

1.5.5 Activity E.2.4 Support training to Reference Laboratory personnel

The first training in the use of monitors and in the calibration of monitors will be undertaken during installation, tests and calibrations. Experts from the Reference Laboratory will have to participate in training given to the Monitoring Laboratory personnel.

The EIMP instrument/monitoring expert together with some of the instrument suppliers will perform this training. The Reference Laboratory personnel will have to become experts in all kind of calibration procedures, and will also have to follow some of the on-the-job training that is undertaken at the Monitoring Laboratory

1.5.6 Activity E.5.1 Use of data base at System Manager

Training in the use of the System Manager at the Monitoring Laboratory started in 1997. The main part of this training, including practical use of the system, remote calibrations, data quality controls, cleaning of data, data plots and storage of raw data has to start in the third phase, and be a major part of the tasks undertaken at the Monitoring Laboratory in 1998 and 1999.

1.5.7 Activity E.5.2..Training in use of EEAA data base

The EEAA ambient air pollution data base, including statistical programmes designed for air quality data and report generators, will be installed at the end of 1998. Some training will be given during the installation, but most of the practical work with the data base will have to be undertaken in 1999.

1.5.8 Activity E.6.1..Sample preparations

A major part of the air quality sampling programme is based on integrated sampling on various types of filters. "Clean" filters and impregnated filters will have to be prepared in the laboratory.

Training in the preparation and use of filters will be undertaken at the Monitoring Laboratory during the Fall of 1998. A possible training period at NILU for one selected expert from the Monitoring Laboratory will be considered.

1.5.9 Activity E.6.2..Chemical analyses of various filters

The analytical methods, which will be introduced for SO_2 and NO_2 analyses, have normally not been applied in Egypt before.

A training schedule will be developed, and the training will follow the introduction to preparation of filter materials.

1.6 F. QA/QC

1.6.1 Activity F.2.1 Instrument calibration procedures

Specifications for instrument calibration and descriptions of measurement and sampling procedures (SOP; Standard Operation Procedures) will be developed.

This work was started in Phase 1 and 2. An introductory seminar was given by the instrument supplier company at the end of phase 2. Further elaboration of procedures will be undertaken in Phase 3 starting with filed calibration procedures.

Notes, schemes and SOPs will be developed as part of the training in calibration of monitors. A co-operation between the instrument supplier's experts, the Monitoring Laboratory experts and the Reference Laboratory experts should be established to obtain the best practical and most efficient calibration and span/zero check procedures.

1.6.2 Activity F.2.2 Design QA / QC procedures at Monitoring Laboratory

Well defined descriptions of day by day analytical routines, including quality control, are essential for generating reproducible results. The monitoring laboratory will have to handle both automatically monitored data received via telephone communication direct to the local computers and manually collected samples that will be analysed by wet chemical or other analytical methods.

A QA/QC programme will be prepared for both types of data. The procedures will be quite different. The content in the performance of work will also be quite different. The staff assigned to undertake the different tasks will have to have different backgrounds and will be working on quite different operations.

It is important that the responsible laboratory team is committed to include QA/QC as routine part of their tasks. Sufficient time and resources for this part of the work has to be provided from the start.

For the monitoring system the QA/QC adviser together with the EIMP instrument expert will undertake the necessary training relating to the data retrieved by computer aided systems.

For the sampling system the EIMP Reference Laboratory manager will support the design of QA/QC procedures for the analytical programme.

1.6.3 F.2.3 Establish Standard Operational Procedures as part of QA/QC

Standard Operational Procedures (SOP) will be developed as an important part of the QA/QC procedures.

A template (standard list of information to be collected) for the preparation of SOPs will be supplied by the Air Pollution Specialist. This can be used for checking existing procedures and form a basis for updating and supplementing the procedures.

More detailed procedures will be developed during the establishment of the monitoring and sampling programme in Phase 3.

1.6.4 Activity F.3.1 QC and calibration routines as part of the on-the-job training

The Monitoring Laboratory personnel will have the responsibility for the operation of monitors and samplers, and for undertaking weekly controls in field.

For samplers this includes flow controls, time check, cleaning, handling etc..

For samplers it includes zero and span controls, flow controls and various check lists that will be part of the on-the-job training. Manuals and check lists will have to be followed at every visit. All these manuals will be presented, used and repeated during the training in field.

1.7 G. Monitoring

1.7.1 Activity G.1.1 Prepare work plan for 1999 activities .

The detailed planning of the activities of Phase 4 covering 1999 will be made taking into account the experience gained during Phase 1 - 3.

1.7.2 Activity G.2.1 Specify sampling programme procedures

The sampling programme consists of integrated (sequential or individual) samplers, from which samples have to be collected and brought to the laboratory for analyses. A list of parameters including sampling times and frequencies was presented in Phase 1. This schedule will have to be updated, when the sampling programme starts in phase 3 (the end of 1998).

The Egyptian Air Quality Standards already indicate some of the averaging times requested for reporting the air quality in Egypt. These specifications have also been applied in the design procedures.

Frequencies and averaging time will vary dependent upon instrumentation at each site. The monitors linked to on-line data transfer will meet all requirements, while integrated sequential and manual samplers at its best will be based upon 24 h average samples.

1.7.3 Activity G.2.2 Specify monitoring programme procedures

A list of parameters including sampling times and frequencies has been developed. A complete monitoring programme for Egypt was designed at the end of Phase 2. Sites, parameters, instruments and installation schedules were indicated. The sites selected and the procedures developed for the operation of the moni-

toring programme meet the QA/QC requirements. Detailed procedures for operation of the programme will be developed in 1998.

1.7.4 Activity G.2.3 Start monitoring programme and data retrieval

The first monitoring stations were installed and started in 1997 at Tabbin Institute and at Cairo University. A third site at Gemoroya street has been prepared and calibrated, and will be in operation at the end of 1997/beginnin of 1998.

An important part of this phase of the monitoring programme is to train the operational personnel at Cairo University (Monitoring Laboratory) to participate in and to undertake installations and calibrations of the different type of monitors. Also personnel at the monitoring institution in Alexandria (ISGR) will participate in the installation work.

Data retrieval routines was tested and verified in 1997. The sequence for the opening of new monitoring stations depends to a certain degree upon available telephone lines. However, a schedule for installation in 1998 has been established.

1.7.5 Activity G.3.1 Establish monitoring station infrastructure

During Phase 1 a list of construction work, repair, maintenance, cleaning etc. at the selected monitoring sites was specified. During the site inspections and site visits all these tasks were described in details. The EIMP counterpart, Dr Nassar, has taken the responsibility for undertaking all these preparations. He will also be responsible for agreements, communication lines, shelters and all kind of infrastructure at the sites.

At most of the sites no telephone lines have been available. No on-line data will be possible until telephone line are installed. Discussions with the Communication Authorities started in 1997, as mentioned in Activity D.5.1.

Most of the sites have 220 V electrical power sockets. The possibility of using this has to be verified through the agreements established with the site owners.

1.7.6 Activity G.3.2 Install monitors in Cairo and Alexandria

The installation of monitors in Cairo started in 1997. The installation programme will continue according to a well defined schedule also in the third phase of the programme in 1998. The monitoring personnel from the Monitoring institutions will have to be trained in installation and calibration, and will participate in the installation programme.

At the end of 1998 they will have to share time between operation, installation, calibration and maintenance. A considerable work load may be placed on this personnel, and we will have to consider during phase 3 and 4, whether the number of people operating the system is adequate.

1.7.7 Activity G.3.3 Start monitors in Delta and Upper Egypt

Most of the installations and calibrations for the Delta and Upper Egypt will take place in 1999. All the monitors for the Delta will be installed in 1999. However, some stations such as samplers in the Delta and in the Canal area are planned to be installed at the end of 1998.

1.7.8 Activity G.4.1. Maintenance and calibrations at the monitoring stations

As soon as the measurement sites are installed and in operation there will be a continuous need for maintenance and calibration. Weekly visits will be paid to all monitoring sites from the Monitoring Institutions. ISGR in Alexandria will have the responsibility for the sites in Alexandria and in the Delta. EHMC at Cairo University will have the responsibility for the rest of the stations in Egypt.

Final arrangements concerning some of the sites will have to be discussed in Phase 3. A maintenance and visit schedule will have to be developed by the monitoring institutions, including support from institutions outside EHMC and ISGR, where this is necessary. This could be possible for Upper Egypt.

1.7.9 Activity G.4.2 Service and repair

As part of the weekly visits to the stations, together with the daily quality controls undertaken by the monitoring institutions, the need for repair and service will be evaluated by the instrument experts.

Monitors and samplers will be taken to the laboratory for repair when ever necessary. In some cases simple repairs will be undertaken at the station.

1.7.10 Activity G.5.1. Data retrieval and data evaluation

As soon as the first data are retrieved at the monitoring laboratory a data evaluation will start. Some simple tests were run already on data retrieved on discettes from Tabbin in November 1997. The continuation of this work in 1998 will be part of the on-the-job training.

First of all calibration factors will have to checked. Next span check points, errors, peak values, false data and other peculiarities in the retrieved data have to be taken out.

A time plot of the data will be produced, first of all at the Monitoring Laboratory at Cairo University but also later at IGSR in Alexandria, to evaluate the diurnal, weekly and spatial variation in concentrations.

Training in the judgement of concentration levels and units will be undertaken during 1998.

1.7.11 Activity G.5.2 Data presentation

After the first air quality data have been evaluated, and the QA/QC procedures have been undertaken and verified, the first data presentation will be prepared. The first report was originally assigned for the end of phase 2. However, very few data were available and the report will have to be delayed till the beginning of 1998.

A brief report will be written describing the background, data availability, data quality and the data itself. A validation/discussion of the results will follow the data presentations.

1.7.12 Activity G.6.1 Sample preparation

Most of the sampling programme is based on collection of particles and gases on various types of filters. These filters have to be prepared before exposed in the field.

A programme for preparation will be developed, and the operations will be initiated as part of the training programme conducted in September-October 1998

1.7.13 Activity G.6.2 Chemical analyses

The chemical analyses of samples collected will be undertaken by the chemical laboratory at the Environmental Hazard Mitigation Centre (EHMC) at Cairo University.

Preparation of samples and chemical analyses will start during the second half of 1998. An analytical expert on inorganic chemistry will undertake introduction and training in the analytical part of the air monitoring programme, and it is anticipated that routine operations and analyses will be undertaken from the end of phase 3.

1.7.14 Activity G.7.1 Quarterly reports

Quarterly reports will developed by the monitoring institutions and delivered to EEAA as part of the data background. These reports will contain some raw data, data availability information, data quality background, and some aggregated data.

As a beginning we have assumed that selected raw data and aggregated information will follow these quarterly reports on a CD rom.

The first quarterly report will contain a very limited amount of information. During 1998 these reports will be developed to meet the requirements of EEAA.

1.7.15 Activity G.7.2 Annual reports

An annual report including some simple statistical evaluation of the data, description of the present monitoring programme and summary comments to the air quality situation in Egypt will developed during Phase 3.

Air pollution levels will be compared to Air Quality Standard values, and exceedances of the limit values will be discussed. The first fully recognised annual report will be issued at the end of 1998.

1.8 H. Reference Laboratory

1.8.1 Activity H.2.1 Training of Reference Laboratory personnel

Training will be undertaken for the Reference Laboratory Air personnel as part of the introduction and on-the-job training for the Monitoring institutions. Selected experts will be invited to participate in the training in operation, calibration and maintenance of monitors.

These activities will start at the end of Phase 2 and will continue into Phase 3.

1.9 Component Co-ordination

1.9.1 Activity I.1.1 Annual plan 1999

The annual plan for 1999 will be developed at the end of 1998.

1.9.2 Activity I.2.1 Follow up and administration

Several activities related to the Air Quality Monitoring Programme have to be undertaken during the year (Phase 3). Some of them are foreseen such as Workin Group meetings, reply to questions and changes in schedules, reporting and programme evaluations.

A number of meetings are held during the task managers missions to Egypt. Comments to questions related to air quality or to other related matters linked to the EIMP programme have to be prepared.

Mission reports , as a basis for the annual reporting, and a documentation of meetings, progress, discussions, various inputs etc. have to be prepared and printed.

1.9.3 Activity I.3.1 Annual report

The annual report will be prepared at the end of Phase 3.

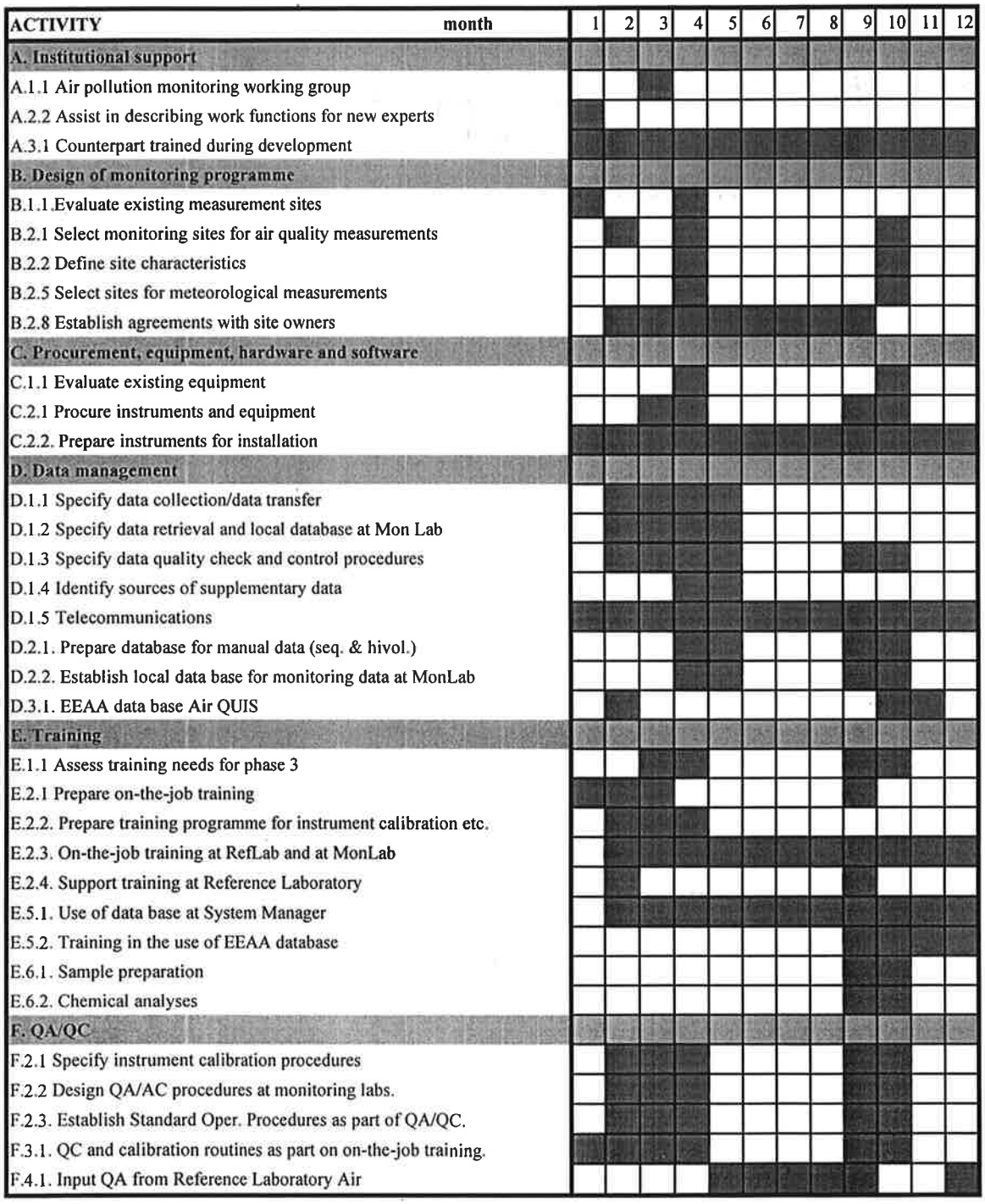
1.10 Work plan for Phase 3

The work plan for air pollution monitoring is given as Exhibit 4.2 overleaf

The work plan is based upon the descriptions given above. We have assumed that a data base for ambient air pollution data will be based upon the system established for the point source emission inventory; AirQUIS.

We have also included the NILU expert on sample preparations and chemical analyses, necessary to undertake the sampling programme from the second part of Phase 3.

EIMP Air Pollution Monitoring Programme
Annual Plan of Action 1998



EIMP Air Pollution Monitoring Programme

Annual Plan of Action 1998

ACTIVITY month	1	2	3	4	5	6	7	8	9	10	11	12
G. Monitoring												
G.1.1 Prepare plan of action for 1999												
G.2.1. Specify sampling programme procedures												
G.2.2. Specify monitoring programme and data retrieval												
G.2.3. Start monitoring programme and data retrieval												
G.3.1. Update monitoring station infrastructures												
G.3.2. Install and start monitors in Cairo and Alexandria												
G.4.1. Maintenance and calibratioon												
G.4.2. Service and repair												
G.5.1. Data retrieval and data evaluation												
G.5.2. Data presentations												
G.6.1. Sample preparation												
G.6.2. Chemivcal analyses												
G.7.1. Quarterly reports												
G.7.2. Annual reports												
H. Reference Laboratory												
H.2.1. Training RefLab in use of monitors and calibration												
H.3.1. Check field monitors												
H.3.2. Audit programme												
I. Component Follow-up and Co-ordination												
I.1.1 Annual plan												
I.2.1. Follow-up, meetings and administration												
I.3.1. Annual report												

EIMP Air Quality Monitoring Staff	1	2	3	4	5	6	7	8	9	10	11	12	Total
Bjarne Sivertsen Team leader ambient air)													3
Leif Marsteen (air pollution monitoing expert)													6
Oddvar Røyset (wet chemistry analyses, lab expert)													1
Atle Riise (ambient air quality data base)													2
Total air monitoring component													12

Assumed an additional of 5,5 man-months due to additional work in 1997

EIMP Air Quality Monitoring Programme

Time schedule for installations

				1998 (month)												1999 (month)										
	Site name		N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
	Cairo																										
1	Cairo city El Qualaly.	Sh					m																				
2	El Gemhoroya street				m																						
3	Meteorological Inst											m															
4	Nasr City								s																		
5	Maadi(police station)	(sh)						m																			
6	Tabbin		m																								
7	Tabbin south	sh								s																	
8	Fum El Khalig	Sh											m														
9	Abu Zabel								s																		
10	Shoubra el Kheima.						m																				
11	Giza, Cairo University.		m	m																							
12	Gizapyramid							p							p												
13	6 October										s																
14	10 Ramadan											s															
	Canal area																										
15	Suez	Sh															m										
16	Port Said															s											
17	Ismailia															s											
	Upper Egypt																										
18	El Fayum														s												
19	El Minya														s												
20	Assyut 1	Sh																			m						
21	Assyut 2																					s					
22	Naga Hammadi																								s		
23	Luxor							p							p							s					
24	Edfu							p							p								s				
25	Kom Ombo							p							p								s				
26	Aswan							p							p									m			
	Sinai Area																										
27	Sharm ElSheik							p											m								

EIMP Air Quality Monitoring Programme
Time plan for installations

		1998														1999										
Site name		**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**
Alexandria																										
28 Abu Keir College													m													
29 El-Max Petrogas	sh													s												
30 IGSR, Alex University	Sh				m																					
31 El-Azafra-El Azhar Univer	sh													s												
32 Gheat El-Inab school	sh													s												
33 NIOF													m													
Delta Area																										
34 Damanhur	sh																s									
35 Kafr el Zayet	Sh																m									
36 Tanta																		s								
37 ElMahalla El Kubra	sh																	m								
38 El Mansura	sh																		m							
39 Domyat																			s	m						
Instr. at Ref Lab		m	m																							
Instr. at Mon Lab		m																								

m = monitoring station (monitors)
s = sampling station
p = passive sampling

Sh = shelter (2m x 2m x 2,10 m)
sh = shelter (1,5 m x 1,5m x 2 m)

Staff input schedule

Name	Position	Acc 96-97	plan for 1998 j	f	m	a	m	j	j	a	s	o	n	d	1998	Proj tot x)	Proj Budg
Bjarne Sivertsen	Task manager	6,3													3	10,5	10,6
Leif Marsteen	Air poll. specialist	5,2													6	11,8	17,3
Oddvar Røyset	Chemical analyses	0													1		
Atle Riise	Air Quis data base	0													2		
Total for air monitoring		11,5													12	28,8 ?	33,4

x) The total budget numbers have been adjusted to include the additional 5,5 months lost during Phase 1-2.

STAFF INPUT SCHEDULE for 1998

			Input in Egypt (man-months)																
		Year	1996-7	1997												1998	-2000	Proj.	Sum
Comp.	Name	Position	Tot.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			Tot [1]	
Institutional Support	Jan M. Hassing/NN	Team Leader	22.6													12	24	58.6	
	Jørn Borch Jacobsen	Procument	0.7															0.7	
	Jacob Andersen	Env. Data Specialist	6.3													3	2.5	11.8	
	Kim Jacobsen/Chr. Poll	Env. Data Specialist	1.5													0.7	0	2.2	73.3
Coastal Water Monitoring	Arne Jensen	Task Manager, Coastal Waters	4.8													2.5	1	8.3	
	Helle Vang Andersen	Marine Monitoring Expert	0													3.5	7.8	11.3	
	Erling Poulsen	Marine Biologist	3.4													2.6	1	7	26.6
Air Pollut. Monit.	Bjarne Sivertsen	Task Manager, Air Pollution	6													3	4.8	13.8	
	Leif Marsteen	Air Pollution Specialist	6													5.6	4	15.6	
	Oddvar Røyset	Wet chemestry analysis expert														1	0	1	
	Atle Riise	Ambient air quality database														1	2	3	33.4
Point Sources Monitoring	Douglas Clark	Task Manager, Point Sources	10.2													1	2.2	13.4	
	Jørn Rokkjær/Jens Vang	Air Emission Specialist	1.8													2	0	3.8	
	Thomas Kongerslev/ L. G. And.	Waste Specialist	2.2													1.6	0	3.8	
	Susanne Petersen	Waste Water Sampl .Specialist	1.4													0.6	0	2	
	Atle Riise	Waste Water Sampl .Specialist														1.5	0	1.5	24.5
Reference Laboratory	Ulla Lund	Task Manager, Reference Lab.	10.8													11.1	3	24.9	
	Vibeke Jensen	QA/QC Advisor	0.3													2.1	1	3.4	
	Jill Merry	Proficiency Testeing Specialist	0													2.4	0.9	3.3	
	Lis Rasmussen	Analytical Chemist	1													2.3	0	3.3	
	Kirtsten Holst	Analytical Chemist	2.1													4.9	0	7	
	Lars Gram	Air Chemist														2	0	2	
	Flemming Boisen	Microbiologist	1.2													2.7	2.2	6.1	50
	Misc. Specialists	Home Office Support	1.8													0.2	0.7	2.7	2.7
			84.1													69.3	57.1	211	210.5

1) Total includes actually spent + planned

Man-month input in Egypt calculated as: calender days/30

Appendix M

Visit to Carbon Black Co.

MEMO

To: EEAA, Dr. M ElZarka
From: Bjarne Sivertsen, EIMP
Date: 9 November 1997

Visit to Carbon Black Co. S.A.E on 6 November 1007

EEAA visited Alexandria carbon Co. S.A.E. on 6November 1997 by request from H.E. Minister of Environment to evaluate the environmental conditions and the potential impact of air emissions from the Alexandria Carbon Black Co. The background has been complaints lodged by the farmers and the news report in the Al Ahram Newspaper on 2 November 1997. The following persons participated in the mission:

1- Mr Mohamed El Zarka, EEAA
2- Mr. Bjarne Sivertsen, EEAA/EIMP
3- Dr M. El Raey, Alexandria University IGSR
4- Dr.Fatma Abou Shouk Alexandria Governorate
5- Engineer Fathi
6- Mr R.K. Rungta, Vice President Carbon Black
7- Mr. M Prasad, Vice President Carbon Black

Available reports presented by Tabbin institute (Sept 1997) and data collected by the factory was presented. From these data it was evident that the surrounding impart from the Carbon Black factory was not at the high level indicated by the complaints from the neighbouring population.

However, some simple estimates based upon emission data should be provided to verify the expected maximum ground level concentrations of TSP, Black smoke , SO_2 and NO_2.

From the visit to the area south of the factory (the maximum impact area) it also seemed that air pollution problem does not have the magnitude earlier assumed. The air quality problem in the surrounding area of the Carbon Black factory seems to be complicated. The long term average concentrations at ground level (24 h averages and longer) probably lead to pollution load and impacts that are smaller than earlier assumed. Based upon simple estimates performed from emission data provided by the factory, the ground level concentration will seldom exceed air quality standards. However, SO_2 may occasionally be around the levels given in the environmental law (air quality limit values) for Egypt. This remains to be verified.

In a few cases there may be accidental releases of black soot from the factory, which may deposit on plants in the area. It is not believed that these deposits will cause any health impact. However, all efforts should be implemented to reduce the possibility for these accidents. They also represent "loss of product", and it would be in the interest of the factory to reduce them.

In the present situation it was proposed that the factory undertake the following actions:

1- Complete emission data should be provided from the factory, including stack heights, exit gas temperatures, gas flow rates, and emission rates of SO_2,TSP,soot and NO_x,
2- Any diffuse emissions should be reported,
3- Frequently and amount of accidental releases should be indicated,
4- A monitoring site should be selected and installed about 400 m south of a factory stack area,
5- Air quality monitoring, included meteorological measurements, should be operated by an independent consultant for a period of at least one year,
6- The results should be analysed, evaluated and reported to EEAA,
7- An impact assessment evaluation should be performed based upon measurement data and dispersion modelling.

Appendix N

Global Air Quality Network

EIMP

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

Memo

To: Dr ElZarka
Copy: Dr M Nasar
From Bjarne Sivertsen
Date: 26 October 1997

Global air quality measurement networks

There are several global networks for air pollution measurements operating on different scales.

AMIS

For local, urban and industrial air pollution problems, relevant to the EIMP programme the old UNEP/WHO programme GEMS is the most relevant one. GEMS has recently changed its name to AMIS (Air Monitoring and Information System)
This system is now exclusively operated from the World Health Organisation (WHO) in Geneva. I recently discussed the system with the responsible WHO officer Dr. Dietrich Schwela. He is informed about the EEAA/EIMP programme on air quality monitoring for Egypt, and want very much to obtain data from it in the future.

AMIS is being reorganised with a new objective of providing comprehensive information needed for rational air quality management. The programme will expand its geographical coverage, with emphasis on developing countries, improve data quality and increase the use of other data such as meteorological data, traffic statistics and emission data.

International assessments af air quality world wide is being performed, and the environmental issues of large urban complexes are specially adressed.

GAW (Global Atmosphere Watch)

The GAW programme is operated by WMO (World Meteorological Organisation) as an integral part of the Global Climate Observing System (GCOS) established by WMO, UNESCO, UNEP and ISCU. GAW is devoted to the investigation of changing chemical composition and related physical characteristics of the GLOBAL

atmosphere. GAW is a co-ordinated network of observing stations, associated facilities and infrastructures related to the activities of GAW.

The main objectives of GAW are related to greenhouse gas problems, the ozone layer, surface radiation, reactive gases and related meteorological parameters and include more that 100 monitoring stations world wide.

The EMEP programme

The European Monitoring and Evaluation Programme is deigned to study regional air pollution problems, transboundary air pollution, acid rain and impact on a European scale. The programme was established in 1977. Today 35 countries participate with more than 100 measurement sites. The programme is operated by NILU (Norwegian Institute for Air Research) on behalf of United Nations Economic Commission for Europe in Geneva (UN/ECE).

Most of the measurement sites in this programme are representative for background areas or residential areas. Both gases, aerosols and deposition measurements are included in the programme.

Appendix O

Air Quality Data from Tabbin, Nov. 1997

Weekly Air Quality Data

		Date hour	SO2 µg/m3	NO2 µg/m3	PM10 µg/m3	RH %	WS m/s	WD DEG	Temp DegC
01.11.97	0000	01.11.97 00:00	2,9	18,2	404	80,5	3,51	337,9 m	19,95
01.11.97	0100	01.11.97 01:00	7,2	37,2	266 R	86,3	2,3	326 m	19,15
01.11.97	0200	01.11.97 02:00	7,7	43,1	341	93,7	2,62	320,9 m	18,32 R
01.11.97	0300	01.11.97 03:00	4,3	36,5	207	98,4 m	2,85	251,2 m	17,63 R
01.11.97	0400	01.11.97 04:00	5,1	37,4	60 R	96,1	2,18	324,9 m	17,47 r
01.11.97	0500	01.11.97 05:00	3,5	35,9	247 R	96,4	2,71	343 m	17,35 R
01.11.97	0600	01.11.97 06:00	2,9 -	25,2	465 R	89,2	2,78	35,7 m	17,6
01.11.97	0700	01.11.97 07:00	2,7 -	20,5	334 R	81	2,81	90,4 m	20,13
01.11.97	0800	01.11.97 08:00	2,4 -	7,3	528	72,7	5,58	62,8 r	22,51
01.11.97	0900	01.11.97 09:00	2,4 -	9,4	293	61,1	5,1	75,1 r	24,85
01.11.97	1000	01.11.97 10:00	2,4 -	7,1	139	49,8	4,74	74,7 r	26,73
01.11.97	1100	01.11.97 11:00	11,4 I	8,6	82	37,8	3,35	86 r	29,11
01.11.97	1200	01.11.97 12:00	8,2	5,8	44	32,6	3,54	80,8 r	29,71
01.11.97	1300	01.11.97 13:00	21,5	7,0	41	32,2	2,45	245,7 r	30,92
01.11.97	1400	01.11.97 14:00	11,2	9,2	43 R	36,6	3,24	285,8 R	30,01
01.11.97	1500	01.11.97 15:00	27,1	14,9	67 R	36,4	2,5	285,8 R	28,95
01.11.97	1600	01.11.97 16:00	26,9	42,9	106 R	42,6	3,05	327,7 r	27,71
01.11.97	1700	01.11.97 17:00	32,7	54,9	155 R	51,7	3,63	331,2 r	25,42
01.11.97	1800	01.11.97 18:00	59,9	44,2	333	52,3	3,93	337,7 m	24,45
01.11.97	1900	01.11.97 19:00	31,4	35,7	323 R	49,9	4,47	14,3 m	24,3
01.11.97	2000	01.11.97 20:00	15,4	35,0	447	47	3,67	127,3 m	24,06
01.11.97	2100	01.11.97 21:00	19,2	29,1	293	49	4,73	146,9 m	23,82
01.11.97	2200	01.11.97 22:00	37,8	22,4	232 R	53,3	5,1	54,5 r	23,25
01.11.97	2300	01.11.97 23:00	9,8	10,7	759 R	59,7	5,28	70,5 +	22,54
02.11.97	0000	02.11.97 00:00	6,4	11,1	520 R	63	4,65	81 R	22,02
02.11.97	0100	02.11.97 01:00	61,7	45,7	962	53,8	5,54	122 R	22,3
02.11.97	0200	02.11.97 02:00	99,2	72,4	692 R	49,1	3,32	157,1 R	22,65
02.11.97	0300	02.11.97 03:00	77,1	31,4	669	50,5	5,46	98,3	22,63
02.11.97	0400	02.11.97 04:00	186,7 R	61,1	530 R	49,3	3,57	166,5 R	23,06
02.11.97	0500	02.11.97 05:00	126,6	57,3	840	52	4,61	137,2 R	22,14
02.11.97	0600	02.11.97 06:00	116,2	43,2	819 -	54,1	4,73	156 r	22,43
02.11.97	0700	02.11.97 07:00	37,8	24,6	I	52,6	4,02	179,8 I	21,23
02.11.97	0800	02.11.97 08:00	183,0 R	37,2	I	51,4	3 I	187,7 I	22,82
02.11.97	0900	02.11.97 09:00	419,2 r	45,3	I	43,2	4,84 I	210,3 I	25,5
02.11.97	1000	02.11.97 10:00	89,6 R	17,7	I	40,4	8,05 -	189,6 r	25,61
02.11.97	1100	02.11.97 11:00	391,3 r	53,8	I	41,4	5,88 -	202,6 I	27,01
02.11.97	1200	02.11.97 12:00	85,9 R	16,4	I	34,3	5,52 -	209,9 I	27,76
02.11.97	1300	02.11.97 13:00	156,1 r	38,5	I	24,9	5,7 -	186,8 I	28,44
02.11.97	1400	02.11.97 14:00	192,6 R	46,6	I	24,2	6,46	160,1 r	28,15
02.11.97	1500	02.11.97 15:00	98,4 R	24,1	I	25,6	5,38 -	199,9 I	27,6
02.11.97	1600	02.11.97 16:00	10,1	8,5	I	30,4	3,79 -	228,2 I	25,95
02.11.97	1700	02.11.97 17:00	6,4	7,0	I	37,3	2,64 -	244,9 I	24,18
02.11.97	1800	02.11.97 18:00	9,0	8,6	I	41,3	2,06 I	238,6 r	22,97
02.11.97	1900	02.11.97 19:00	56,7	26,3	I	45,8	2,77 I	212 r	21,72
02.11.97	2000	02.11.97 20:00	135,9	39,3	I	51,3	2,91 I	203,9 I	20,56
02.11.97	2100	02.11.97 21:00	254,6 R	47,8	I	50,6	3,11 I	202,4 I	19,47
02.11.97	2200	02.11.97 22:00	254,6 R	43,6	I	51,8	2,86 I	206,6 I	18,84
02.11.97	2300	02.11.97 23:00	185,9	34,8	I	54,9	2,45 I	194,8 r	17,89
03.11.97	0000	03.11.97 00:00	64,6	20,9	I	56	2,49 I	183,9 I	17,39
03.11.97	0100	03.11.97 01:00	23,7	25,6	I	56,4	2,38 -	155,2 R	17,13
03.11.97	0200	03.11.97 02:00	67,6	24,1	I	56,8	3,31 -	170,7 R	16,76
03.11.97	0300	03.11.97 03:00	87,5	23,1	I	57	4,52	174,2 r	16,58
03.11.97	0400	03.11.97 04:00	29,0	27,3	I	66,6	3,19 -	182,7 I	15,75
03.11.97	0500	03.11.97 05:00	29,8	33,7	I	68	3,95	179,2 R	15,38
03.11.97	0600	03.11.97 06:00	21,0	29,9	I	68,9	4,35	177,5 R	15,57
03.11.97	0700	03.11.97 07:00	17,8	29,0	I	64,7	4,04 -	177,5 r	16,68
03.11.97	0800	03.11.97 08:00	12,2	13,9	I	57,4	5,42 -	185,7 r	18,58
03.11.97	0900	03.11.97 09:00	60,1 R	18,2	I	48,9	5,95 -	189,6 I	20,57
03.11.97	1000	03.11.97 10:00	129,3 R	25,0	I	42,5	5,66 -	196,9 r	23,06
03.11.97	1100	03.11.97 11:00	219,2 r	31,8	I	42,5	6,14 -	202,1 r	24,58
03.11.97	1200	03.11.97 12:00	108,0 R	17,7	I	42,3	6,33 -	209,3 I	25,23
03.11.97	1300	03.11.97 13:00	105,1 R	17,5	I	39,4	6,07 -	193,2 I	25,94
03.11.97	1400	03.11.97 14:00	20,5	6,8	I	38,8	4,83 -	216,7 I	25,29
03.11.97	1500	03.11.97 15:00	6,7	6,6	I	38,3	3,95 -	266,9 I	25,04
03.11.97	1600	03.11.97 16:00	3,7	10,3	I	39,8	3,03 -	261,3 r	24,37

03.11.97	1700	03.11.97 17:00	2,9	-	7,9			I	43,2	2,65	I	250,2	I	23,06
03.11.97	1800	03.11.97 18:00	2,7	-	8,1			I	44,6	1,93	I	249,5	I	22,16
03.11.97	1900	03.11.97 19:00	4,3		9,2			I	47,9	1,63	I	261,2	r	21,42
03.11.97	2000	03.11.97 20:00	13,6		25,2			I	56,1	1,22	I	268,4	R	20,42
03.11.97	2100	03.11.97 21:00	14,9		40,4			I	63	0,55	I	270,7		19,26
03.11.97	2200	03.11.97 22:00	20,2		53,2			I	66,6	2,22	I	192		18,57
03.11.97	2300	03.11.97 23:00	13,3		29,5			I	64,5	1,9	I	182,1	R	17,86
04.11.97	0000	04.11.97 00:00	5,1		38,0			I	71	1	I	178,4		16,67
04.11.97	0100	04.11.97 01:00	8,8		30,1			I	69,1	1,27	I	186,1	R	16,62
04.11.97	0200	04.11.97 02:00	14,1		46,1			I	73,9	1,17	I	175,9	R	15,81
04.11.97	0300	04.11.97 03:00	10,1		24,4			I	73,1	1,35	I	158,8		15,56
04.11.97	0400	04.11.97 04:00	15,2		33,5			I	76	1,06	I	194,8	R	15,24
04.11.97	0500	04.11.97 05:00	17,8		32,1			I	75,6	2,91	-	179,9	r	15,21
04.11.97	0600	04.11.97 06:00	10,1		31,2			I	80	2,51	-	184,2	R	15,01
04.11.97	0700	04.11.97 07:00	7,7		27,3			I	82,4	2,45	I	174,3	R	15,75
04.11.97	0800	04.11.97 08:00	16,0		29,0			I	76,7	3,11	-	176	r	17,7
04.11.97	0900	04.11.97 09:00	10,6		14,9			I	72	4,18	-	178,4	I	19,61
04.11.97	1000	04.11.97 10:00	89,4	R	9,2			I	64,2	3,89	I	178,1	I	22,48
04.11.97	1100	04.11.97 11:00	51,9	R	3,2			I	52,3	4,08	I	193,2	I	24,43
04.11.97	1200	04.11.97 12:00	11,2		3,0	-		I	46,2	3,17	I	242,2	I	25,35
04.11.97	1300	04.11.97 13:00	7,7		1,5	-	0	I	46,7	3,81	-	233,3	r	25,11
04.11.97	1400	04.11.97 14:00	10,1		3,2		0	I	42,6	4,04		255,1	r	25,49
04.11.97	1500	04.11.97 15:00	6,7		6,0		0	I	39	5,32		286,5	r	25,61
04.11.97	1600	04.11.97 16:00	20,7		15,4		66	I	40,8	4,56		297,8	r	24,42
04.11.97	1700	04.11.97 17:00	17,0		20,3		89	R	41,9	3,63		308,7	r	22,98
04.11.97	1800	04.11.97 18:00	12,8		32,1		112	R	42,8	2,58		317,1	r	22,08
04.11.97	1900	04.11.97 19:00	12,0		39,7		128	R	44,4	2,55		323,8	I	21,47
04.11.97	2000	04.11.97 20:00	16,0		34,4		168	R	47,2	2,96		326,4	r	20,65
04.11.97	2100	04.11.97 21:00	14,1		63,4		129		51,1	1,94		309,9	r	19,49
04.11.97	2200	04.11.97 22:00	28,7		65,8		74		55,9	1,3		133,9	R	18,42
04.11.97	2300	04.11.97 23:00	25,3		70,5		209	R	56,3	1,54		237,7	+	17,87
05.11.97	0000	05.11.97 00:00	31,4		54,7		275		62,5	1,09		275,5	R	17,02
05.11.97	0100	05.11.97 01:00	16,5		46,8				67,4	1,1		61	+	16,38
05.11.97	0200	05.11.97 02:00	13,3		26,9				66,8	2,3		72,6		16,38
05.11.97	0300	05.11.97 03:00	57,2		28,2				68,7	1,15		106	R	15,98
05.11.97	0400	05.11.97 04:00	28,2		30,5				71,1	1,61		129,8		16,18
05.11.97	0500	05.11.97 05:00	10,9		57,9				74,8	1,27		202,3		15,93
05.11.97	0600	05.11.97 06:00	43,1		55,3				72,6	1,53		195,3	+	15,54
05.11.97	0700	05.11.97 07:00	95,5		47,2				66,8	1,7		203,9	R	16,98
05.11.97	0800	05.11.97 08:00	98,7		41,9				58,3	2,58		207	r	19,56
05.11.97	0900	05.11.97 09:00	64,1	R	18,2				53,6	3,19		203,1	r	21,59
05.11.97	1000	05.11.97 10:00	59,9		7,5				46	3,39		217	r	24,71
05.11.97	1100	05.11.97 11:00	64,6	R	8,1				41,1	3,46		202,5	r	26,7
05.11.97	1200	05.11.97 12:00	111,2	R	22,2				40,2	3,86		194,3	r	27,63
05.11.97	1300	05.11.97 13:00	23,1		5,5				37,1	3,24		264,3	r	28,6
05.11.97	1400	05.11.97 14:00	17,8		8,6				36,1	2,35		263,3	r	29,12
05.11.97	1500	05.11.97 15:00	14,6		14,7				39,1	4,14		325,4	r	27,91
05.11.97	1600	05.11.97 16:00	17,0		16,4				42,8	4,18		326,2	m	25,6
05.11.97	1700	05.11.97 17:00	38,6		17,3				46,5	4,22		332,5	r	23,95
05.11.97	1800	05.11.97 18:00	124,5		37,6				48,6	3,91		338,6	m	23,18
05.11.97	1900	05.11.97 19:00	97,6		51,9				53,4	3,82		336,7	m	22,6
05.11.97	2000	05.11.97 20:00	36,2		42,1				55,3	4,34		342,9	m	21,94
05.11.97	2100	05.11.97 21:00	12,0		24,3				62,3	4		262,5	m	21,01
05.11.97	2200	05.11.97 22:00	14,9		31,4			R	67,1	3,73		210,7	m	20,36
05.11.97	2300	05.11.97 23:00	8,8		20,3				69,9	2,9		322,7	m	19,82
06.11.97	0000	06.11.97 00:00	8,5		21,4				72,3	2,78		142,9	m	19,32
06.11.97	0100	06.11.97 01:00	6,9		14,3				72,9	2,76		49,3	m	19,04
06.11.97	0200	06.11.97 02:00	5,6		35,7				76,7	1,23		304,8	m	18,09
06.11.97	0300	06.11.97 03:00	4,0		51,1				84,2	2,32		288,8	m	17,33
06.11.97	0400	06.11.97 04:00	8,0		50,6				88,9	2,47		331,5	m	17,11
06.11.97	0500	06.11.97 05:00	5,3		48,5				92	2,04		334,6	m	16,82
06.11.97	0600	06.11.97 06:00	8,2		47,6				93,5	1,84		335,1	m	16,51
06.11.97	0700	06.11.97 07:00	11,4		55,3				86,6	1,7		272,8	m	17,97
06.11.97	0800	06.11.97 08:00	19,7		63,4				80,2	2,22		309,1	m	20,02
06.11.97	0900	06.11.97 09:00	38,3		42,9				70,1	3,15		315,8	m	22,52
06.11.97	1000	06.11.97 10:00	16,5		22,2				56,9	4,69		323,6	r	24,55
06.11.97	1100	06.11.97 11:00	14,1		21,4				52	5,29		340,5	m	25,37
06.11.97	1200	06.11.97 12:00	23,4		38,9			R	51,6	5,32		327,6	m	25,91
06.11.97	1300	06.11.97 13:00	31,7		32,1				43,2	5,73		326,1	r	26,28
06.11.97	1400	06.11.97 14:00	28,5		34,8				41,5	5,51		332,7	r	26,13
06.11.97	1500	06.11.97 15:00	30,1		33,3			R	40,1	5,03		332,6	m	25,38

06.11.97	1600	06.11.97 16:00	40,2	50,6		45,8	3,84	325,7 m	23,75	
06.11.97	1700	06.11.97 17:00	30,6	49,6		49,8	3,82	338 m	22,18	
06.11.97	1800	06.11.97 18:00	18,9	24,1		51,2	3,67	347 m	21,53	
06.11.97	1900	06.11.97 19:00	11,2	35,2		53,1	3,81	6,5 m	20,77	
06.11.97	2000	06.11.97 20:00	5,9	25,9		58,2	4,61	12,2 m	19,98	
06.11.97	2100	06.11.97 21:00	4,5	28,6		63,9	4,69	22,5 m	19,24	
06.11.97	2200	06.11.97 22:00	3,7	29,7		69,5	3,28	13,3 m	18,4	
06.11.97	2300	06.11.97 23:00	2,4 I	12,6		72,7	3,92	345 m	17,78	
07.11.97	0000	07.11.97 00:00	2,4 I	10,3		74,7	3,96	345,4 m	17,4	
07.11.97	0100	07.11.97 01:00	2,4 I	11,3		78,4	3,95	359,6 m	16,69	
07.11.97	0200	07.11.97 02:00	5,9 I	27,1		83	2,92	337,8 m	16,12	
07.11.97	0300	07.11.97 03:00	15,2	46,8		89,1	2,04	282,4 m	15,16	
07.11.97	0400	07.11.97 04:00	9,0	43,2		90,6	1,73	311,7 m	14,67	R
07.11.97	0500	07.11.97 05:00	6,7	38,7		95,4	2,26	240,6 m	14,26	r
07.11.97	0600	07.11.97 06:00	11,2	39,9		94,4	2,28	248,6 m	14,33	r
07.11.97	0700	07.11.97 07:00	15,7	45,7		89,6	2,38	336 m	16,01	R
07.11.97	0800	07.11.97 08:00	17,3	47,4		81,3	4,84	331,2 m	18,89	
07.11.97	0900	07.11.97 09:00	15,7	32,3		71,2	5,14	330 m	21,68	
07.11.97	1000	07.11.97 10:00	10,6	14,1		63,2	5,96	55,7 m	23,66	
07.11.97	1100	07.11.97 11:00	4,8	3,6		53,7	7,33	32,6 m	24,63	
07.11.97	1200	07.11.97 12:00	3,7	4,9		48,6	7,15	35,9 m	25,73	
07.11.97	1300	07.11.97 13:00	2,7 -	4,3		45,4	8,44	26,4 r	26	
07.11.97	1400	07.11.97 14:00	2,4 I	4,7		45,2	8,4	30,8 m	26,14	
07.11.97	1500	07.11.97 15:00	2,7 I	8,5		50,2	7,97	340 m	25,72	
07.11.97	1600	07.11.97 16:00	2,9 I	13,5		57,4	8,26	356,2 m	24,46	
07.11.97	1700	07.11.97 17:00	2,4 I	6,6	R	59,1	8,21	8,7 m	23,31	
07.11.97	1800	07.11.97 18:00	0,5 I	9,0		62	7,69	356,5 m	22,4	
07.11.97	1900	07.11.97 19:00	0,5 I	9,2		66,7	7,05	348,5 m	21,48	
07.11.97	2000	07.11.97 20:00	0,5 I	9,8		72	7,03	15,8 I	20,61	
07.11.97	2100	07.11.97 21:00	0,5 I	8,1		78,5	6,3	20,2 m	19,93	
07.11.97	2200	07.11.97 22:00	0,5 I	11,8		82,7	5,97	10,7 m	19,5	
07.11.97	2300	07.11.97 23:00	0,5 I	10,3		85,8	5,79	2,7 m	19,01	

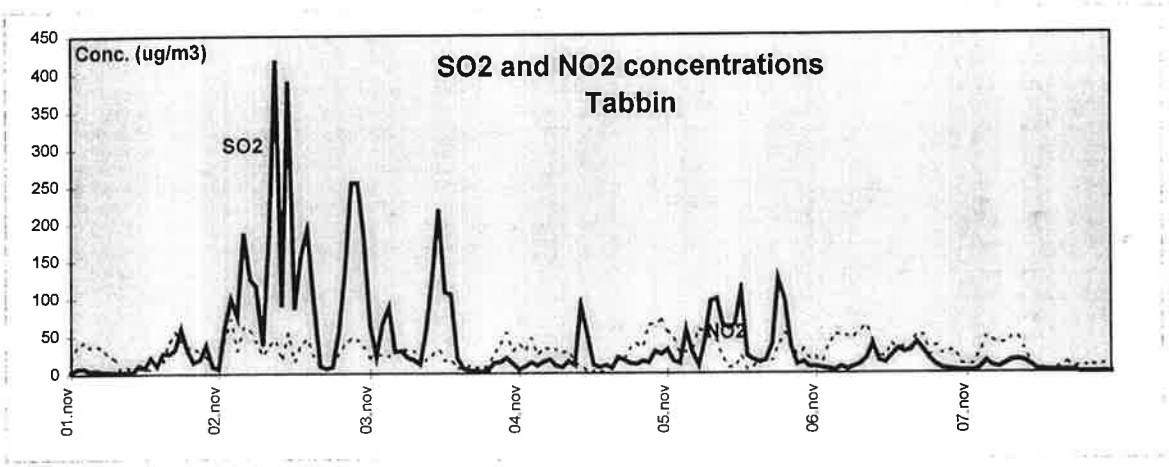
Conversion factors:

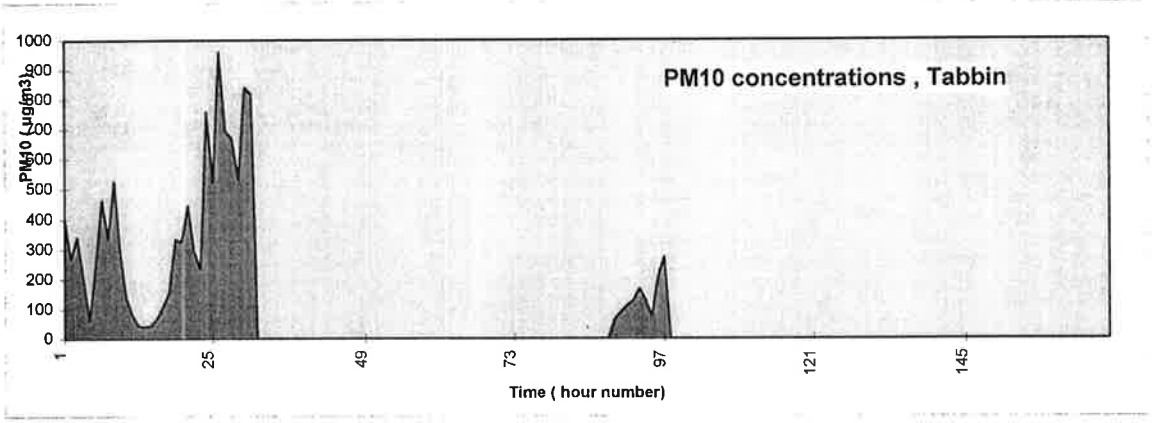
SO2 (ppm)x2,66=ug/m3
NO2 (ppm)x1,88 =ug/m3
O3 (ppm) = 1,96 ug/m3

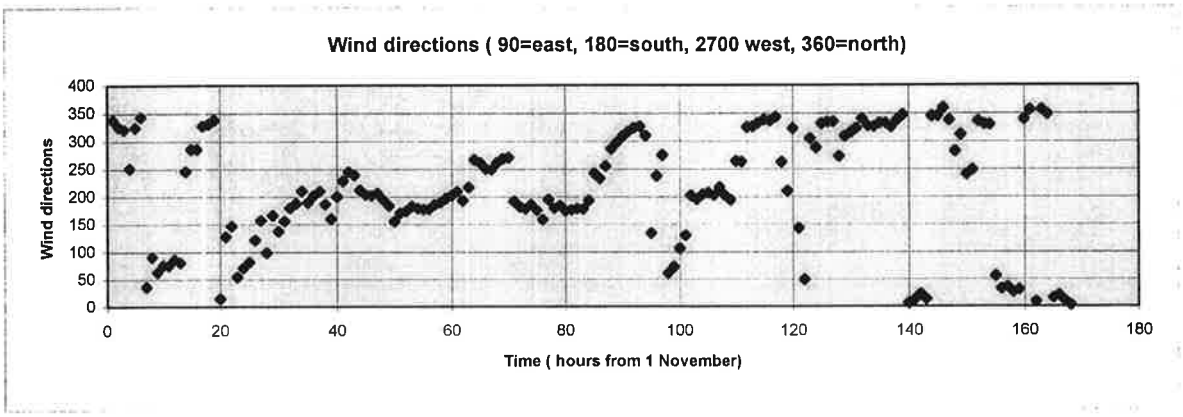
Daily (24h) average values

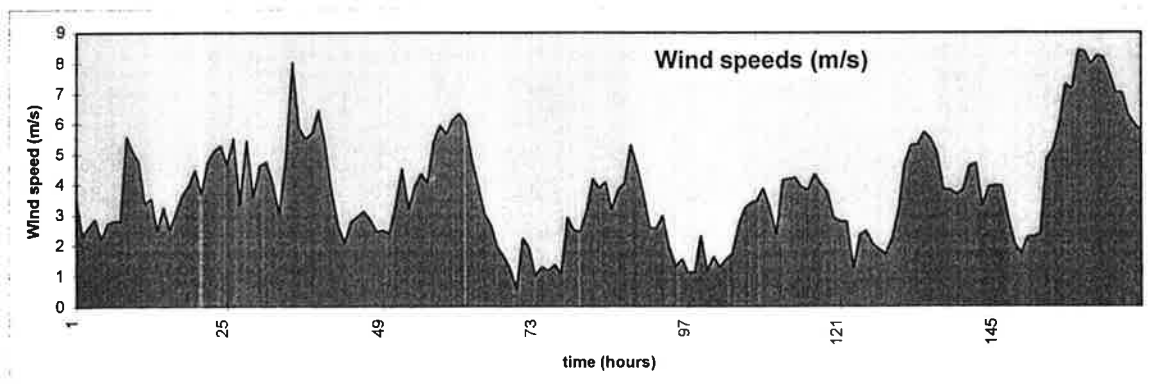
	(µg/m3)				
Date	SO2	NO2	Pm10	WS(m/s)	T (degC)
1-nov-97	14,8	24,9	258,7	3,6	23,6
2-nov-97	135,1	35,1	209,7	4,3	23,5
3-nov-97	44,9	22,3	0,0	3,7	20,3
4-nov-97	18,3	28,1	40,6	2,8	20,0
5-nov-97	45,8	29,8	11,5	2,9	21,4
6-nov-97	15,7	36,2	0,0	3,6	20,9
7-nov-97	5,7	19,2	0,0	5,5	20,3
Egypt Env. Law AQ limit values	150	150	70		

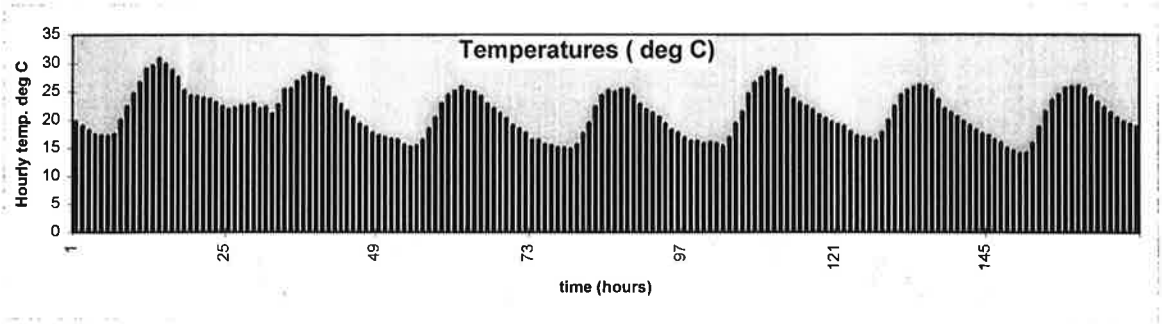
Air Quality Data from Tabbin

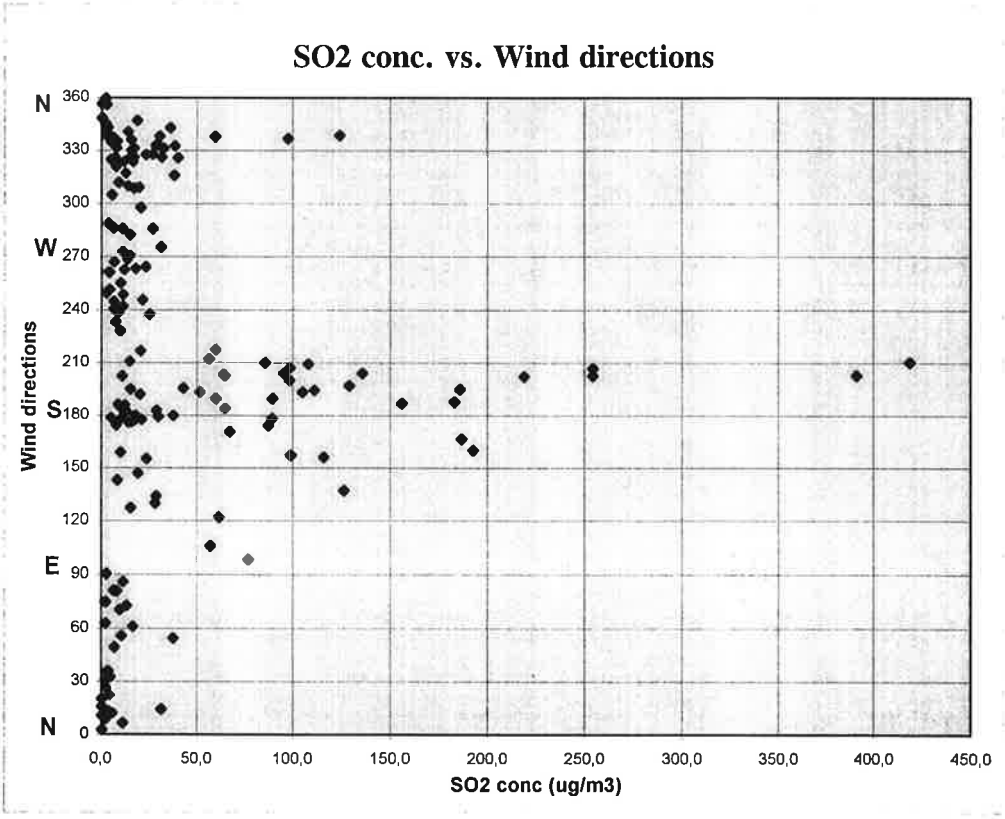









Temperatures (deg C)
Hourly temp. deg C
35
30
25
20
15
10
5
0
1
25
49
73
97
121
145
time (hours)


SO2 conc. vs. Wind directions
Wind directions
N
360
330
300
W
270
240
210
S
180
150
120
E
90
60
30
N
0
0,0
50,0
100,0
150,0
200,0
250,0
300,0
350,0
400,0
450,0
SO2 conc (ug/m3)

Weekly Air Quality Data

		Date hour	SO2 µg/m3		NO2 µg/m3		PM10 µg/m3		RH %		WS m/s		WD DEG		Temp DegC	
11.11.97	0000	11.11.97 00:00	1,2	I	10,3		82		76,4		2,35		182	m	18,02	
11.11.97	0100	11.11.97 01:00	2,3		27,7		82		84,2		1,4		323,9	m	16,85	
11.11.97	0200	11.11.97 02:00	2,6		25,3		82		90		1,68		332,1	m	15,81	
11.11.97	0300	11.11.97 03:00	3,0		22,1		82		93,9		1,86		201,9	m	15,36	
11.11.97	0400	11.11.97 04:00	3,5		21,5		82		96,9		1,85		309,2	+	15,03	R
11.11.97	0500	11.11.97 05:00	2,4		19,0		82		99,1	m	2,62		151,9	m	14,87	r
11.11.97	0600	11.11.97 06:00	2,4		19,4		82		100,1	m	2,48		334,2	m	14,86	r
11.11.97	0700	11.11.97 07:00	4,0		21,9		82		94,4	+	1,47		288,6	m	16,47	R
11.11.97	0800	11.11.97 08:00	6,7	c	27,7	c	83	R	80		1,02		256,7	m	19,24	
11.11.97	0900	11.11.97 09:00	25,1	C	13,5		83	R	72,8		2,66		304,3	l	21,95	
11.11.97	1000	11.11.97 10:00	12,6		15,2		82		71,3		3,89		321,7	l	23,07	
11.11.97	1100	11.11.97 11:00	11,1		7,9		82		66,5		4,11		318,6	r	23,6	
11.11.97	1200	11.11.97 12:00	4,2		0,8	l	82		54,5		4,85		237,3	r	25,39	
11.11.97	1300	11.11.97 13:00	3,0		1,3	l	82		52,6		4,6		339,5	m	25,44	
11.11.97	1400	11.11.97 14:00	5,1		8,5	-	82	R	51,8		4,74		331,8	m	25,43	
11.11.97	1500	11.11.97 15:00	7,0		14,9		82	R	52,7		5,25		330,1	r	24,9	
11.11.97	1600	11.11.97 16:00	8,1		19,1		82		58,8		3,94		328,1	m	23,47	
11.11.97	1700	11.11.97 17:00	13,3		14,5		82		63,7		3,05		330,3	r	21,82	
11.11.97	1800	11.11.97 18:00	11,7		12,9		82		66,6		3,15		323,4	m	20,89	
11.11.97	1900	11.11.97 19:00	5,9		6,1		82		66,4		4,94		339,6	m	20,84	
11.11.97	2000	11.11.97 20:00	1,7	-	2,5		82		70,3		5,28		42,9	m	20,58	
11.11.97	2100	11.11.97 21:00	1,0	I	2,1		82		76,4		5,21		356,1	m	19,63	
11.11.97	2200	11.11.97 22:00	1,5	I	17,7		82		81,5		4,27		318,4	m	19,12	
11.11.97	2300	11.11.97 23:00	2,7		18,8		82		86,4		3,63		307,4	m	18,42	
12.11.97	0000	12.11.97 00:00	3,2		16,8		82		88,9		3,95		326,1	m	18,07	
12.11.97	0100	12.11.97 01:00	4,4		20,0		82		92,6		2,99		312,2	m	17,53	
12.11.97	0200	12.11.97 02:00	2,7		17,2		82		94,6		2,17		293,6	m	16,91	
12.11.97	0300	12.11.97 03:00	2,2		23,5		82		96,3	m	1,72		273,3	R	16,25	R
12.11.97	0400	12.11.97 04:00	2,3		22,8		82		100,1	m	2,06		314,9	m	15,49	r
12.11.97	0500	12.11.97 05:00	2,2		21,9		82		100,1	m	1,97		277,4	+	15,06	r
12.11.97	0600	12.11.97 06:00	1,9		20,8		82		100,1	m	1,67		260,3	m	14,93	r
12.11.97	0700	12.11.97 07:00	2,2		20,5		82		100,1	m	1,8		326,6	m	16,07	r
12.11.97	0800	12.11.97 08:00	3,9	c	21,7	c	83	R	91,7	+	2,93		330	m	18,56	
12.11.97	0900	12.11.97 09:00	16,1	C	4,2		83	R	73,8		5,8		51,1	m	22,28	
12.11.97	1000	12.11.97 10:00														
12.11.97	1100	12.11.97 11:00	2,7	p	1,2	p	0	p	48,8	p	6,75	p	60	p	25,43	p
12.11.97	1200	12.11.97 12:00	1,7	I	1,9	-	537	I	46,3		5,82		52,1	m	26,04	
12.11.97	1300	12.11.97 13:00	1,6	p	0,7	p	0	p	42,4	P	6,05	P	45,4	p	26,8	P
12.11.97	1400	12.11.97 14:00	1,6	I	2,6	-	0	I	39,4		5,99		54,1	I	26,71	
12.11.97	1500	12.11.97 15:00	0,4	I	1,2		730	I	26,3	I	25,91	I	33,9	I	26	m
12.11.97	1600	12.11.97 16:00	0,0	p	2,5	p	578	p	7,5	p	41,09	p	162,7	p	27	p
12.11.97	1700	12.11.97 17:00	0,0	p	4,0	P	411	P	30,6	p	35,82	p	185,8	p	23	p
12.11.97	1800	12.11.97 18:00	0,0	p	2,4	P	291	P	50,1	p	5,33	p	0	p	22,29	p
12.11.97	1900	12.11.97 19:00	0,0	I	3,7		167		59,8		6,77		31,1	r	21,78	
12.11.97	2000	12.11.97 20:00	0,0	I	2,6		132		70,7		7,19		35,2	r	20,67	
12.11.97	2100	12.11.97 21:00	0,0	I	5,6		97		73		5,93		45,7	r	19,97	
12.11.97	2200	12.11.97 22:00	2,1	I	25,5		168	R	78		4,06		57,1	r	19,57	
12.11.97	2300	12.11.97 23:00	5,7		21,1		187		80,9		3,82		58,7	r	19,05	
13.11.97	0000	13.11.97 00:00	5,3		19,1		418	R	82,3		5,15		55,2	R	18,77	
13.11.97	0100	13.11.97 01:00	6,6		24,5		591		85,8		3,88		56,6	r	18,21	
13.11.97	0200	13.11.97 02:00	2,4	-	24,0		725	R	87,9		4,64		68,4	m	17,82	
13.11.97	0300	13.11.97 03:00	0,7	I	8,5		873		88,5		3,42		295,2	m	17,14	
13.11.97	0400	13.11.97 04:00	0,5	I	8,0		499		88,9		2,74		197,5	m	16,82	
13.11.97	0500	13.11.97 05:00	1,5	-	25,9		523	R	88,9		3,09		79,5	r	16,76	
13.11.97	0600	13.11.97 06:00	1,1	I	20,7		453		86,7		2,92		74,2	r	17,08	
13.11.97	0700	13.11.97 07:00	7,7	I	13,3		88		76,8		3,26		54,3	r	19,25	
13.11.97	0800	13.11.97 08:00	23,0	c	10,0	c	114	R	65,3		4,9		52	R	21,34	
13.11.97	0900	13.11.97 09:00	5,3	C	6,8		141		52,8		3,66		56,8	r	24,33	
13.11.97	1000	13.11.97 10:00	4,0		7,0		103		46,3		4,02		69,2	r	26,23	
13.11.97	1100	13.11.97 11:00													28	
13.11.97	1200	13.11.97 12:00	1,0	p	60,4	p	95	p	28,5	p	4,2	p	70,8	p	29,89	p
13.11.97	1300	13.11.97 13:00	1,0	I	1,5	-	121	I	25		3,41		73,3	r	30,44	
13.11.97	1400	13.11.97 14:00	2,7	-	23,4	c	86		31,1		3,63		218	m	29,86	
13.11.97	1500	13.11.97 15:00	3,0		18,1	C	49	I	38,9		4,09		305,9	r	27,92	
13.11.97	1600	13.11.97 16:00	17,9	C	25,8	C	206	I	43,6		4,73		306,2	r	25,8	

13.11.97	1700	13.11.97 17:00	8,8	30,5		133	48,1	5,58	319,3 r	23,75
13.11.97	1800	13.11.97 18:00	16,5	37,8		231 R	47,3	5,37	325,3 r	23
13.11.97	1900	13.11.97 19:00	3,5	11,4		336	62,9	6,84	44,7 r	22,09
13.11.97	2000	13.11.97 20:00	1,2 I	12,7		218	71,6	4,73	40,6 r	20,74
13.11.97	2100	13.11.97 21:00	3,0	19,2		300 R	75,5	5,18	46,6 r	20,11
13.11.97	2200	13.11.97 22:00	1,6 I	10,4		298	76,2	3,51	238 r	19,39
13.11.97	2300	13.11.97 23:00	0,9 I	9,3		158	78,5	3,67	327,2 r	18,85
14.11.97	0000	14.11.97 00:00	0,8 I	10,3		115 R	81	3,77	338,1 m	18,32
14.11.97	0100	14.11.97 01:00	0,5 I	5,2		73	80,8	4,12	348,2 r	17,92
14.11.97	0200	14.11.97 02:00	0,0 I	5,0		55 R	82,2	2,55	209 r	17,14
14.11.97	0300	14.11.97 03:00	0,0 I	10,2		37 I	86,2	2,63	331,1 r	16,38
14.11.97	0400	14.11.97 04:00	0,0 I	9,7		43 I	95,8	2,96	331,3 r	15,82
14.11.97	0500	14.11.97 05:00	1,0 I	14,8		43 I	98,2	2,64	333,6 r	15,24
14.11.97	0600	14.11.97 06:00	0,7 I	16,2		110 I	99,1	2,61	326,7 r	14,86
14.11.97	0700	14.11.97 07:00	1,1 I	15,8		88	96,3	2,52	318,4 r	15,91
14.11.97	0800	14.11.97 08:00	5,3 c	23,1		491 R	84,9	2,77	305 m	18,19
14.11.97	0900	14.11.97 09:00	23,2 C	29,7		788 R	72,6	3	303 m	21
14.11.97	1000	14.11.97 10:00	13,5	24,3		808 R	61	3,67	312,7 m	24,49
14.11.97	1100	14.11.97 11:00	10,6	21,4		848	55,9	4,24	309,4 m	26,42
14.11.97	1200	14.11.97 12:00	12,5	16,8		421	44,1	5,17	307,9 r	27,77
14.11.97	1300	14.11.97 13:00	2,6 -	4,8		92	33,8	6,2	178 r	28,76
14.11.97	1400	14.11.97 14:00	1,3 -	17,4	c	47 I	32,1	6,73	181,4 r	28,73
14.11.97	1500	14.11.97 15:00	1,0 I	3,7		399 I	36,8	7,13	329,6 r	27,74
14.11.97	1600	14.11.97 16:00	0,9 I	5,0		309	40,2	6,62	0 m	25,85
14.11.97	1700	14.11.97 17:00	0,6 I	7,7		366 R	43,4	5,67	0 r	24,34
14.11.97	1800	14.11.97 18:00	0,7 I	8,5		432	55,8	6,58	342 m	23,04
14.11.97	1900	14.11.97 19:00	0,9 I	7,8		341	69,3	6,55	32,4 r	21,73
14.11.97	2000	14.11.97 20:00	0,0 I	6,0		290	75,2	5,1	96,3 r	20,4
14.11.97	2100	14.11.97 21:00	0,0 I	4,4		238	78,9	5,48	0 r	19,52
14.11.97	2200	14.11.97 22:00	0,0 I	6,9		204	82,5	4,17	170,8 r	18,97
14.11.97	2300	14.11.97 23:00	0,0 I	7,2		163	86,5	4,44	299 r	18,62
15.11.97	0000	15.11.97 00:00	0,0 I	3,9		136	89,4	4,09	28,8 m	18,17
15.11.97	0100	15.11.97 01:00	0,0 I	3,9		201 R	92,2	3,95	319,7 m	17,4
15.11.97	0200	15.11.97 02:00	0,0 I	7,0		247 R	92,7	4,71	296,8 m	17,31
15.11.97	0300	15.11.97 03:00	0,0 I	6,1		164	94,8	5,24	88,1 r	17,17
15.11.97	0400	15.11.97 04:00	0,0 I	5,6		181 R	95,2	4,31	49,8 r	16,92
15.11.97	0500	15.11.97 05:00	0,0 I	2,7		167 R	92,7	4,49	22,1 m	16,88
15.11.97	0600	15.11.97 06:00	0,0 I	4,3		164 R	91,7	4,46	314,3 r	16,71
15.11.97	0700	15.11.97 07:00	0,0 I	12,3		204	89	4,25	0 r	17,75
15.11.97	0800	15.11.97 08:00	0,0 c	6,4		211 R	82,6	5,15	252,6 m	19,52
15.11.97	0900	15.11.97 09:00	13,9 C	6,6		220 R	71,7	5	109,2 r	22,07
15.11.97	1000	15.11.97 10:00	1,2 I	4,4		253 R	61,2	5,43	113,9 r	24,68
15.11.97	1100	15.11.97 11:00	2,1 -	11,6		368 R	60	5,3	306,5 m	25,99
15.11.97	1200	15.11.97 12:00	4,0 C	10,0	C	324 R	48,2	5,3	190,3 r	27,49
15.11.97	1300	15.11.97 13:00	1,0 I	4,5		234	39,6	5,79	159,1 r	28,89
15.11.97	1400	15.11.97 14:00	0,7 I	17,9	c	165 R	37,6	5,77	58,7 r	28,65
15.11.97	1500	15.11.97 15:00	0,5 I	4,2		92	40,2	6,37	159,3 r	28,16
15.11.97	1600	15.11.97 16:00	1,7 I	7,2		154 R	44	5,83	327,3 r	26,19
15.11.97	1700	15.11.97 17:00	2,9	33,5		171	67,9	4,44	321,7 r	23,38
15.11.97	1800	15.11.97 18:00	4,6	40,5		113	73,7	3,82	322,9 r	22
15.11.97	1900	15.11.97 19:00	3,1	36,5		256 R	75,6	3,66	329,4 m	21,24
15.11.97	2000	15.11.97 20:00	1,1 I	10,4		326	77,3	5,59	24,6 m	21,28
15.11.97	2100	15.11.97 21:00	0,0 I	6,1		304 R	86,6	5,21	26 r	20,17
15.11.97	2200	15.11.97 22:00	0,0 I	5,9		324	89,4	5,21	36,2 m	19,39
15.11.97	2300	15.11.97 23:00	0,0 I	6,6		363 R	89,6	3,55	44,8 m	18,65
16.11.97	0000	16.11.97 00:00								
16.11.97	0100	16.11.97 01:00								
16.11.97	0200	16.11.97 02:00								
16.11.97	0300	16.11.97 03:00								
16.11.97	0400	16.11.97 04:00								
16.11.97	0500	16.11.97 05:00								
16.11.97	0600	16.11.97 06:00								
16.11.97	0700	16.11.97 07:00								
16.11.97	0800	16.11.97 08:00								
16.11.97	0900	16.11.97 09:00								
16.11.97	1000	16.11.97 10:00								
16.11.97	1100	16.11.97 11:00								
16.11.97	1200	16.11.97 12:00								
16.11.97	1300	16.11.97 13:00								
16.11.97	1400	16.11.97 14:00								
16.11.97	1500	16.11.97 15:00								

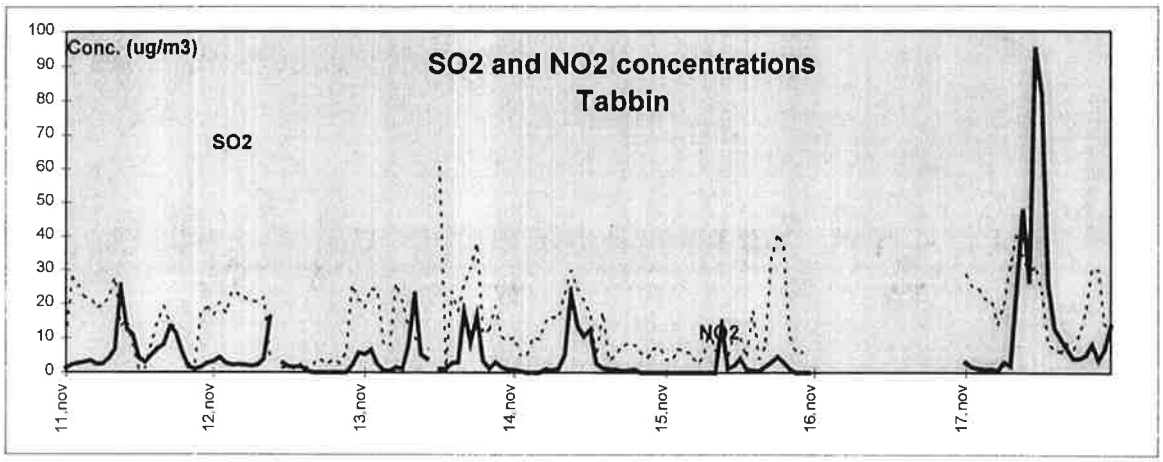
16.11.97	1600	16.11.97 16:00									
16.11.97	1700	16.11.97 17:00									
16.11.97	1800	16.11.97 18:00									
16.11.97	1900	16.11.97 19:00									
16.11.97	2000	16.11.97 20:00									
16.11.97	2100	16.11.97 21:00									
16.11.97	2200	16.11.97 22:00									
16.11.97	2300	16.11.97 23:00									
17.11.97	0000	17.11.97 00:00	2,9	28,4		237	97,8	1,6	299,3 R	16,82	
17.11.97	0100	17.11.97 01:00	1,6 -	25,6		182 R	98,6 m	1,78	237,5 R	16,54	
17.11.97	0200	17.11.97 02:00	1,2 l	24,2		190	0 m	1,6	302,7 R	15,85	
17.11.97	0300	17.11.97 03:00	0,9 l	21,6		131 l	0 m	1,08	300,7 R	15,19	
17.11.97	0400	17.11.97 04:00	1,0 l	21,0		224 l	0 m	1,11	264,4 +	14,74	
17.11.97	0500	17.11.97 05:00	0,7 l	14,2		131	0 m	1,32	190,9 +	14,29	
17.11.97	0600	17.11.97 06:00	3,0 l	20,1		179 R	0 m	1,31	172,4 +	14,22	
17.11.97	0700	17.11.97 07:00	2,0 -	31,3		264	0 m	1,93	132,6 R	14,61	
17.11.97	0800	17.11.97 08:00	23,8 c	40,2		577 R	0 m	2,34	206,3 R	14,83	
17.11.97	0900	17.11.97 09:00	48,1 C	34,3		994	0 m	2,79	203,9 m	16	
17.11.97	1000	17.11.97 10:00	26,2	28,1	C	968 l	0 m	3,18	210,3 r	17,27	
17.11.97	1100	17.11.97 11:00	95,4 R	31,2		0 l	86,2 +	2,39	192 r	21,06	
17.11.97	1200	17.11.97 12:00	81,9 p	23,5	p	0 p	67 p	2,85 p	199 p	24,45	p
17.11.97	1300	17.11.97 13:00	26,0 P	8,7	P	340 P	56,5 P	2,57 P	188,3 p	26,22	P
17.11.97	1400	17.11.97 14:00	12,9 C	6,6	c	225 R	54,7	3,49	183,5 R	26,13	
17.11.97	1500	17.11.97 15:00	10,0 C	6,1		643 R	52,5	2,55	178,1 R	26,19	
17.11.97	1600	17.11.97 16:00	7,0	8,6		582	56	2,69	187,3 R	24,3	
17.11.97	1700	17.11.97 17:00	4,1	6,9		319	58,3	2,53	191,5 R	22,66	
17.11.97	1800	17.11.97 18:00	4,1	11,2		734 R	62,2	2,4	190,4	21,83	
17.11.97	1900	17.11.97 19:00	5,1	18,0		373	65,4	2,02	196,6	20,5	
17.11.97	2000	17.11.97 20:00	8,2	30,3		237	71,1	1,32	250,7	19,4	
17.11.97	2100	17.11.97 21:00	3,8	29,9		755 R	70,7	1,91	154,5	18,7	
17.11.97	2200	17.11.97 22:00	6,7	14,4		380	68	4,71	184,6 R	19,05	
17.11.97	2300	17.11.97 23:00	13,6	13,2		1550 R	69,4	5,06	184,9 R	18,7	

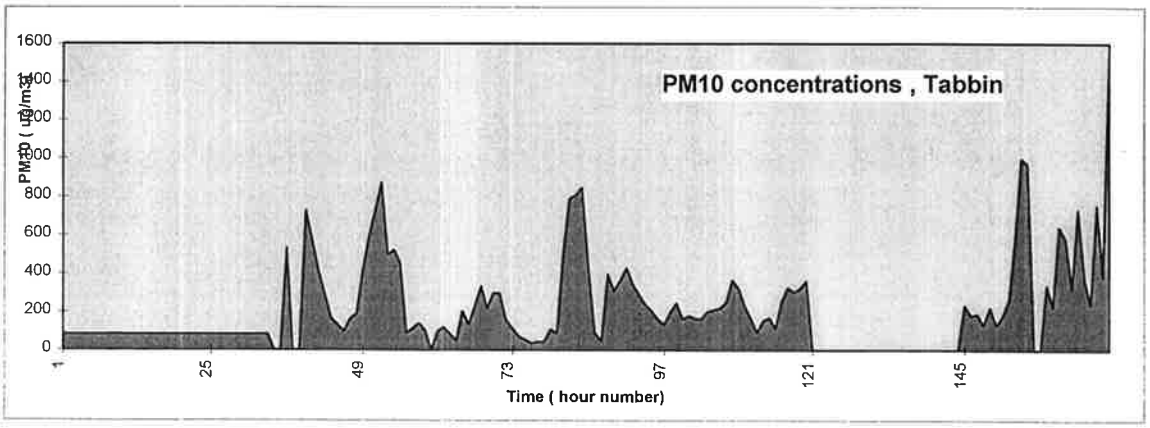
Conversion factors: SO2 (ppm)x2,66=ug/m3
NO2 (ppm)x1,88 =ug/m3
O3 (ppm) = 1,96 ug/m3

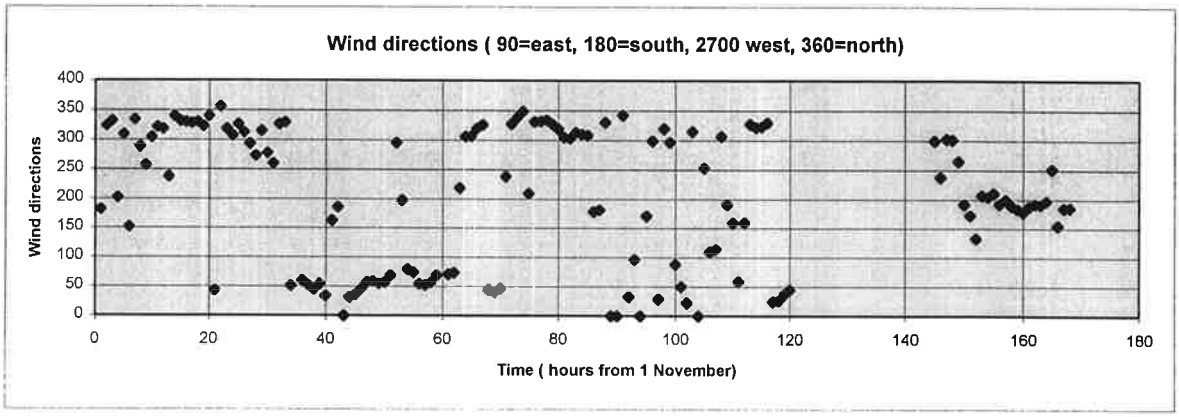
Daily (24h) average values

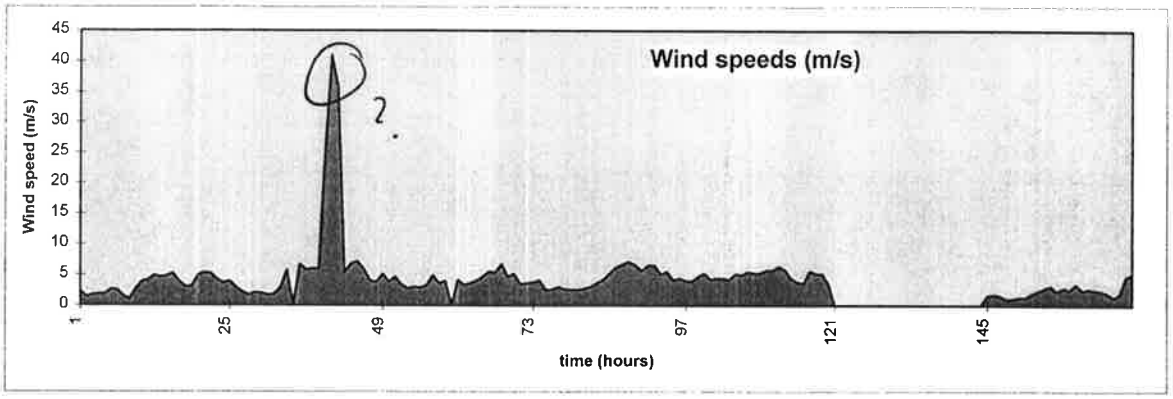
	(µg/m3)				
Date	SO2	NO2	Pm10	WS(m/s)	T (degC)
1-nov-97	5,9	14,6	82,1	3,3	20,0
2-nov-97	2,4	11,0	171,7	7,8	19,8
3-nov-97	5,0	17,8	281,6	4,0	22,2
4-nov-97	3,2	11,7	283,4	4,5	21,1
5-nov-97	1,5	10,8	222,6	4,9	21,5
6-nov-97	0,0	0,0	0,0	0,0	0,0
7-nov-97	16,3	20,7	425,6	2,4	19,1
Egypt Env. Law AQ limit values	150	150	70		

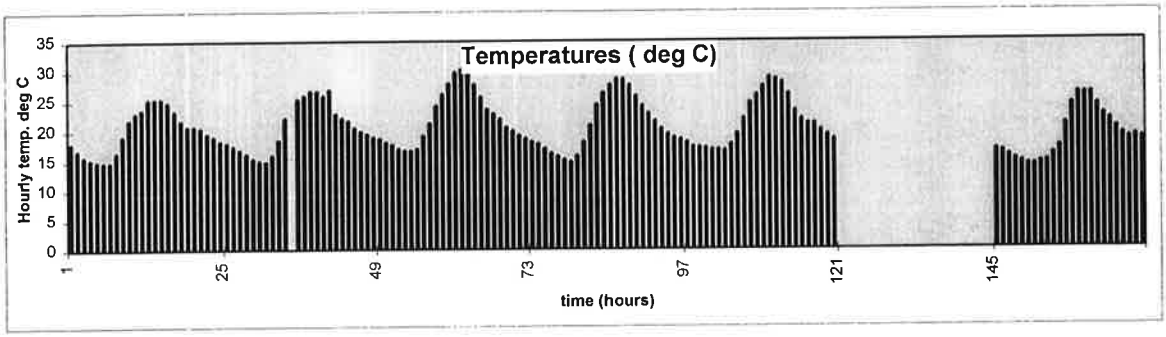
Air Quality Data from Tabbin

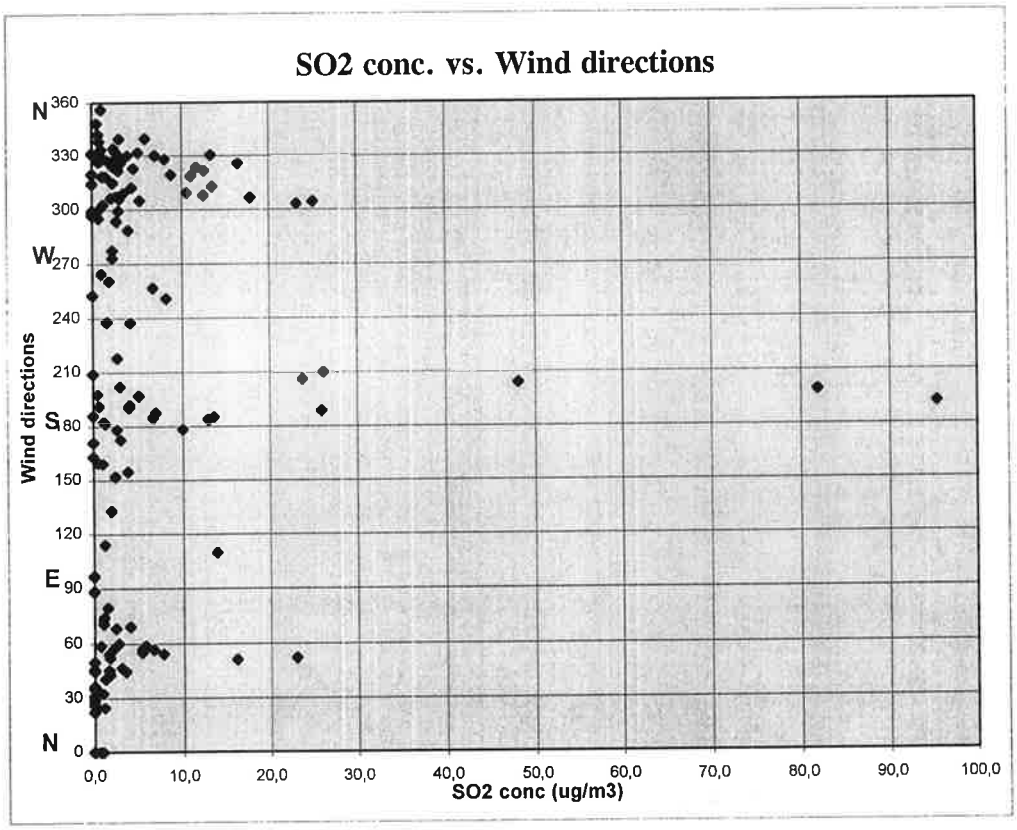









Temperatures (deg C)
Hourly temp. deg C
35
30
25
20
15
10
5
0
1
25
49
73
97
121
145
time (hours)


SO2 conc. vs. Wind directions
Wind directions
N 360
330
300
W 270
240
210
S 180
150
120
E 90
60
30
N 0
0,0
10,0
20,0
30,0
40,0
50,0
60,0
70,0
80,0
90,0
100,0
SO2 conc (ug/m3)

MONTHLY DATA REPORT

Station/Facility: TABBIN
Parameter: NO2 (PPB)
Month/Year: Nov 1997

	HOUR BEGINNING (PST)																									
DAY	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Min.	Max.
1	9.7	19.8	22.9	19.4	19.9	19.1	13.4	10.9	3.9	5.0	3.8	4.6	3.1	3.7	4.9	7.9	22.8	29.2	23.5	19.0	18.6	15.5	11.9	5.7	3.1	29.2
2	5.9	24.3	38.5	16.7	32.5	30.5	23.0	13.1	19.8	24.1	9.4	28.6	8.7	20.5	24.8	12.8	4.5	3.7	4.6	14.0	20.9	25.4	23.2	18.5	3.7	38.5
3	11.1	13.6	12.8	12.3	14.5	17.9	15.9	15.4	7.4	9.7	13.3	16.9	9.4	9.3	3.6	3.5	5.5	4.2	4.3	4.9	13.4	21.5	28.3	15.7	3.5	28.3
4	20.2	16.0	24.5	13.0	17.8	17.1	16.6	14.5	15.4	7.9	4.9	1.7	1.6-	0.8-	1.7	3.2	8.2	10.8	17.1	21.1	18.3	33.7	35.0	37.5	0.8	37.5
5	29.1	24.9	14.3	15.0	16.2	30.8	29.4	25.1	22.3	9.7	4.0	4.3	11.8	2.9	4.6	7.8	8.7	9.2	20.0	27.6	22.4	12.9	16.7	10.8	2.9	30.8
6	11.4	7.6	19.0	27.2	26.9	25.8	25.3	29.4	33.7	22.8	11.8	11.4	20.7	17.1	18.5	17.7	26.9	26.4	12.8	18.7	13.8	15.2	15.8	6.7	6.7	33.7
7	5.5	6.0	14.4	24.9	23.0	20.6	21.2	24.3	25.2	17.2	7.5	1.9	2.6	2.3	2.5	4.5	7.2	3.5	4.8	4.9	5.2	4.3	6.3	5.5	1.9	25.2
8	3.6	6.4	11.7	6.3	3.3	7.0	6.0	8.3	17.2	2.1	1.2	2.1	1.5	1.0	3.3	4.2	11.9	9.0	8.4	7.3	8.3	14.7	8.6	11.7	1.0	17.2
9	12.5	18.7	25.8	23.4	18.1	11.3	13.7	16.9	23.3	27.5	29.1	27.6	19.6	9.1	12.3	18.8	25.5	15.8	12.9	21.1	10.7	11.6	11.2	8.2	8.2	29.1
10	18.4	16.5	14.7	13.2	11.5	15.3	17.7	19.6	24.1	17.5	13.5	10.1	11.4D	7.4d	11.2c	10.0C	9.1	7.9	10.1	1.7	2.7	5.2	6.5	8.6	1.7	24.1
11	10.3	27.7	25.3	22.1	21.5	19.0	19.4	21.9	27.7c	13.5	15.2	7.9	0.81	1.31	8.5-	14.9	19.1	14.5	12.9	6.1	2.5	2.1	17.7	18.8	2.1	27.7
12	16.8	20.0	17.2	23.5	22.8	21.9	20.8	20.5	21.7c	4.2	-9999p	1.2p	1.9-	0.7p	2.6-	1.2	2.5p	4.0P	2.4P	3.7	2.6	5.6	25.5	21.1	1.2	25.5
13	19.1	24.5	24.0	8.5	8.0	25.9	20.7	13.3	10.0c	6.8	7.0	-9999p	60.4p	1.5-	23.4c	18.1C	25.8C	30.5	37.8	11.4	12.7	19.2	10.4	9.3	1.5	37.8
14	10.3	5.2	5.0	10.2	9.7	14.8	16.2	15.8	23.1	29.7	24.3	21.4	16.8	4.8	17.4c	3.7	5.0	7.7	8.5	7.8	6.0	4.4	6.9	7.2	3.7	29.7
15	3.9	3.9	7.0	6.1	5.6	2.7	4.3	12.3	6.4	6.6	4.4	11.6	10.0C	4.5	17.9c	4.2	7.2	33.5	40.5	36.5	10.4	6.1	5.9	6.6	2.7	40.5
16	4.0	9.0	3.7	12.4	20.5	18.7	20.0	17.8	23.3	27.9	31.0	28.7	27.3	19.2	37.3c	26.6	27.7	40.0	38.4	48.9	51.7	33.2	30.5	29.9	3.7	51.7
17	28.4	25.6	24.2	21.6	21.0	14.2	20.1	31.3	40.2	34.3	28.1C	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	14.2	40.2

MONTHLY AVERAGE: 14.9 (PPB)

Monthly: 0.8 Min 51.7 Max

Flags:
= Valid Hour
- = Negative Over Range - Valid Hour
D = Off-Line Part of Hour - Valid Hour
d = Off-Line Part of Hour - Invalid Hour (Airs 9993)
c = Calibration - Invalid Hour (Airs 9986)
C = Calibration - Valid Hour

. .HLY DATA REPORT

Station/Facility: TABBIN
Parameter: SO2 (PPB)
Month/Year: Nov 1997

	HOUR BEGINNING (PST)																									
DAY	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Min.	Max.
1	1.1	2.7	2.9	1.6	1.9	1.3	1.1-	1.0-	0.9-	0.9-	0.9-	4.31	3.1	8.1	4.2	10.2	10.1	12.3	22.5	11.8	5.8	7.2	14.2	3.7	0.9	22.5
2	2.4	23.2	37.3	29.0	70.2R	47.6	43.7	14.2	68.8R	157.6r	33.7R	147.1r	32.3R	58.7r	72.4R	37.0R	3.8	2.4	3.4	21.3	51.1	95.7R	95.7R	69.9	2.4	95.7
3	24.3	8.9	25.4	32.9	10.9	11.2	7.9	6.7	4.6	22.6R	48.6R	82.4r	40.6R	39.5R	7.7	2.5	1.4	1.1-	1.0-	1.6	5.1	5.6	7.6	5.0	1.0	48.6
4	1.9	3.3	5.3	3.8	5.7	6.7	3.8	2.9	6.0	4.0	33.6R	19.5R	4.2	2.9	3.8	2.5	7.8	6.4	4.8	4.5	6.0	5.3	10.8	9.5	1.9	33.6
5	11.8	6.2	5.0	21.5	10.6	4.1	16.2	35.9	37.1	24.1R	22.5	24.3R	41.8R	8.7	6.7	5.5	6.4	14.5	46.8	36.7	13.6	4.5	5.6	3.3	3.3	46.8
6	3.2	2.6	2.1	1.5	3.0	2.0	3.1	4.3	7.4	14.4	6.2	5.3	8.8	11.9	10.7	11.3	15.1	11.5	7.1	4.2	2.2	1.7	1.4	0.91	1.4	15.1
7	0.91	0.91	2.21	5.7	3.4	2.5	4.2	5.9	6.5	5.9	4.0	1.8	1.4	1.0-	0.91	1.01	1.11	0.91	-0.21	-0.21	-0.11	-0.11	-0.21	-1.01	1.0	6.5
8	-0.21	0.91	1.4-	1.51	-1.11	-0.21	0.91	1.01	1.5-	0.91	-0.11	-0.21	-0.21	-0.31	-0.21	-0.11	1.01	1.1-	1.21	0.91	-0.11	0.91	0.01	0.91	1.1	1.5
9	1.21	1.11	2.7	3.1	1.2	1.21	1.11	1.1-	2.0-	4.8	6.6	9.5	5.3	5.7	5.0	8.1	13.1	9.2	3.5	3.8	5.6	2.0	1.51	-0.21	1.1	13.1
10	1.01	1.11	0.91	1.0-	0.91	1.1-	1.9	1.9	3.3	5.9	6.9	5.8	3.4D	3.5c	7.6c	21.0c	9.2	5.0	7.2	1.9-	1.11	0.91	-0.11	2.51	1.0	9.2
11	1.21	2.3	2.6	3.0	3.5	2.4	2.4	4.0	6.7c	25.1C	12.6	11.1	4.2	3.0	5.1	7.0	8.1	13.3	11.7	5.9	1.7-	1.01	1.51	2.7	1.7	25.1
12	3.2	4.4	2.7	2.2	2.3	2.2	1.9	2.2	3.9c	16.1C	-9999p	2.7p	1.71	1.6p	1.61	0.41	0.0p	0.0p	0.0p	0.01	0.01	0.01	2.11	5.7	1.9	16.1
13	5.3	6.6	2.4-	0.71	0.51	1.5-	1.11	7.71	23.0c	5.3C	4.0	-9999p	1.0p	1.01	2.7-	3.0	17.9C	8.8	16.5	3.5	1.21	3.0	1.61	0.91	1.5	17.9
14	0.81	0.51	0.01	0.01	0.01	1.01	0.71	1.11	5.3c	23.2C	13.5	10.6	12.5	2.6-	1.3-	1.01	0.91	0.61	0.71	0.91	0.01	0.01	0.01	0.01	1.3	23.2
15	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0c	13.9C	1.21	2.1-	4.0C	1.01	0.71	0.51	1.71	2.9	4.6	3.1	1.11	0.01	0.01	0.01	2.1	13.9
16	0.01	0.01	0.01	0.71	0.91	1.11	1.2-	1.31	1.5c	17.6C	5.3	6.7	12.4	10.5	10.2	10.5	8.8	6.0	8.7	12.5	8.3	3.5	2.1	2.9	1.2	17.6
17	2.9	1.6-	1.21	0.91	1.01	0.71	3.01	2.0-	23.8c	48.1C	26.2	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	1.6	48.1

MONTHLY AVERAGE: 10.7 (PPB)

Flags:
= Valid Hour
- = Negative Over Range - Valid Hour
1 = Negative Over Range - Invalid Hour (Airs 9983)
R = Rate of Change - Valid Hour
r = Rate of Change - Invalid Hour (Airs 9983)
D = Off-Line Part of Hour - Valid Hour

	Min	Max
Monthly:	0.9	95.7

Appendix P

Introduction to TSP sampling for Training Purposes

EIMP

High Volume Sampling and Analyses

A preliminary introduction for Training Purposes

The sampling of Total Suspended Particles (TSP) in air is performed by a TEI model 610 TSP high volume sampler. The filter used is a 203x254 mm Whatman 41 or Monktell MK 360 micro quarts filter.

Each filter has to be weighed unexposed, before installed in the sampler. The weighing should be performed in a conditioned room for 24 hours at 50 % relative humidity. After weighing the filter is placed in the plastic bag with zip tightening and marked with station identification and/or number.

After exposure in field, for 24 hours every 6th day!, the filter have to be folded into two equal parts with the exposed side IN and put back into the same plastic bag. The filter will always be transported in the plastic bag.

Weighing (or analyses) will be performed after another 24 h in the conditioned weighing room. For analyses of selected elements (lead) a detailed procedure will be developed at the end of 1998. Filters are normally always handled using disposable plastic gloves. This is particularly important when element analyses is to be performed. However, we would like to keep this procedure always during ALL handling of the filter (weighing (use tweezer !) - installation in sampler, removal from sampler - weighing etc..)

When the weighing has been done, the mass is calculated. All data are noted using the form attached. The filter is then stored folded in the plastic bag.

Calculate concentration'
The flow rate of the High Volume sampler is assumed to be 68 m3/h (constant)
The flow rate should be read before and after sampling. (*Details have to developed later*)

The concentration is estimated from

TSP-conc(μg/m3) = W / (RxN)

W = weight of dust on filter (μg)
R = flow rate at Hivol (m^3/h)
N = number of hours sampled (h)

Form
Use the attached form during preparation and weighing of all High Volume filters. One form for each measurement station! Please remember to sign whenever weighing is undertaken.

Weight of TSP on High Volume filters

EIMP

Station name:_____ **Filter type:**_____

Filter number	Date for field exposure	Date blank wgt.	Sign.	Weight (mg) Unexposed f.	Date exposed wgt.	Sign.	Weight (mg) Exposed filter	TSP µg	Notes Comments

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ABSTRACT
The seventh mission to Egypt on the DANIDA EIMP programme included finalizing the siting studies, visits to institutions, a seminar and a workshop and the start up of the air quality monitoring programme.

NORWEGIAN TITLE
Overvåkingsprogram for luftkvalitet i Egypt

KEYWORDS		
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ABSTRACT (in Norwegian)

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- *A Unclassified (can be ordered from NILU)*
- *B Restricted distribution*
- *C Classified (not to be distributed)*