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DANIDA

EIMP Phasing-out Phase, 2003-2004

End of Mission Report, Air Quality
Monitoring, Mission 04, March 2004

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List of Abbreviations:

ASU	:	Ain Shams University
CAIP	:	Cairo Air Improvement Programme
CCC	:	Central Cairo Centre (EEAA)
CEHM	:	Centre for Environmental Hazard Mitigation
Danida	:	Danish International Development Assistance
DKK	:	Danish Currency Unit
EEIS	:	Egyptian Environmental Information System
EIA	:	Environmental Impact Assessment
EIMP	:	Environmental Information and Monitoring Programme
ESP	:	Environmental Sector Programme Support
GIS	:	Geographical Information System
IGSR	:	Institute for Graduate Studies and Research (Alexandria)
NILU	:	Norwegian Institute for Air Research
NIS	:	National Institute for Standardisation
NO ₂	:	Nitrogen dioxide
PM ₁₀	:	Particles with diameter less than 10 micrometer
RDE	:	Royal Danish Embassy
SO ₂	:	Sulphur dioxide
QA / QC	:	Quality Assurance / Quality Control
TA	:	Technical Assistance
ToR	:	Terms of Reference
TSP	:	Total suspended particulates
UAE	:	United Arab Emirates
VOC	:	Volatile Organic Compounds

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1 Introduction

The EIMP project was launched in 1996 with the Egyptian Environmental Affairs Agency (EEAA) as the implementing agency for an environmental information and monitoring programme covering institutional support, coastal waters, air pollution, point sources emissions and the development of reference laboratories for improvement of the quality of monitoring data.

The EIMP project is funded by Danida and headed by COWI. NILU was as sub-consultant to COWI responsible for the design, installations, training and operations of the national air quality monitoring system for Egypt, to be operated by experts in EEAA. The design, installations and training of the monitoring network were completed covering 42 sites all over Egypt in July 2000.

The EIMP Phasing-out Phase has been formulated to consolidate EIMP achievements, while gradually integrating the EIMP activities and staff into the existing EEAA administrative and organisational structure.

The objective is to produce relevant data reports on ambient air quality as well as input to EEAA's State of the Environment reports in the form of reliable monitoring data in order to provide a sound basis for EEAA policy and decision-making. During the Phasing out Phase we will also prepare and maintain newsletters, internet web-site(s) and other relevant data dissemination media in order to ensure that EIMP data be made available to a larger segment of society and thus be used for developing a demand among the wider public for implementation of appropriate environmental policies and regulations

The fourth Mission during the EIMP Phasing out Phase Air Quality component was undertaken during 2 March to 27 March 2004. Responsible for the Mission was Bjarne Sivertsen. Rolf Dreiem participated during the first week inspecting the sites and supporting the monitoring institutions in technical questions. At the end of the week he had a heart attack and had to leave Egypt for hospitalisation in Norway.

A schedule for the Mission is presented in Appendix A.2. People met during the mission are presented in Appendix A.1. References to previous presentations and summary reports are to be found in the reference list.

2 The Monitoring programme

The following research institutions are contracted to undertake the air quality monitoring work:

- Institute for Graduate Studies and Research (IGSR), Alexandria,
- Cairo University, Centre for Environmental Hazard Mitigation (CEHM), Cairo,
- National Institute of Standardisation (NIS), Cairo.
- Ain Shams University (ASU), Cairo,

Meetings were held with the monitoring institutions at Cairo University, CEHM, and with Alexandria University, IGSR to update the status of the monitoring programme. Also NIS was visited to upgrade the calibration instruments and to verify their status concerning the instruments at NIS.

2.1 CEHM monitoring status

The objective of a meeting held on 7 March 2004 was to go through the air quality monitoring programme with all operators present. A summary of the meeting included a status report and some action to be undertaken is presented in Appendix B.2.

The team at CEHM performed most of the work according to the Contract without the necessary money for a total of 11 months. As of 1 January 2004 the operators had not received salaries since July 2003 (April, May, June paid from CEHM).

Transportation, telephone lines, air condition and consumables were paid from CEHM until November 2003. Filters for High volume samplers were delivered by a local dealer and could not be paid. CEHM was blamed and accused for being a bad customer, while EEAA went free for any negative image.

In spite of these economical difficulties all sites in greater Cairo area have been operated. Visits have been paid to most of the sites during the whole period. Some sites had to be skipped due to transportation problems from 1 January till about 20 February. All samplers have been operated as normal, and all chemical analyses have been performed. There does not seem to be significant loss of data of this kind during the period. In Upper Egypt, however, measurements were stopped from November 2003 till March 2004. The money have now been transferred from EEAA, and salaries have been paid.

A conclusion from the discussions, however, was that some deduction of payment had to be implemented to missing data and reduced data availability.

The operations and status of instruments were discussed. Several stations in the greater Cairo area had to be checked and visited by Rolf. He started this work on 8

March, but had to finish after 3 days, as he turned sick. He was sent home on 14 March, and it turned out that he had a light heart attack.

2.2 IGSR monitoring status

A meeting with the staff at IGSR was held in Alexandria on 15 March 2004. The air quality monitoring programme in Alexandria and in the Delta was discussed, as presented in Appendix B.3.

The whole staff performing the field measurements at IGSR participated in the meeting. All sites have been visited regularly and data seem to be present with "normal data availability". Some monitors have been at CEHM for repair, maintenance and calibrations, but most of them seem to have been returned to the sites recently. A main problem related to the measurement programme performed by IGSR is to obtain good quality meteorological data. In fact no meteorological data have been made available recently. There is a need for replacing several of the sensors, which may have been worn out due to their lifetime expectancy.

The Quarterly Report for the fourth quarter 2003 had been prepared and evaluated by B Sivertsen. The report was briefly discussed, and a final version will be made available at the end of March.

Some of the proposals for changes to the monitoring programme in Alexandria were discussed again. Dr Shallaby has visited two potential sites in ElAwaid and El Nosa. It is suggested that the AlAsafra instruments could be moved to one of the new sites.

2.3 VOC sampling

A few samples of VOC have been collected and analysed. The first results of the analyses have been presented and discussed in a memo dated 11 May 2003.

A limited number of volatile organic compound (VOC) samples were collected in Greater Cairo area during the year of 2002. These samples were collected under varying conditions and at different locations. Three samples were collected at each site instantaneous at 30-minute intervals. All samples were collected in the afternoon between 16:00 and 17:00 hrs.

The results of these samples are discussed in Appendix B4. The samples were collected at the following sites:

- Gomhoreya street
- Tabbin South
- Shoubra ElKheima

In the near future also sites in the Delta will have to receive canisters. Samples will be collected at ElShouhada square in Alexandria as well as at the El-Max area and in Damietta.

A summary of results is shown in the following figure.

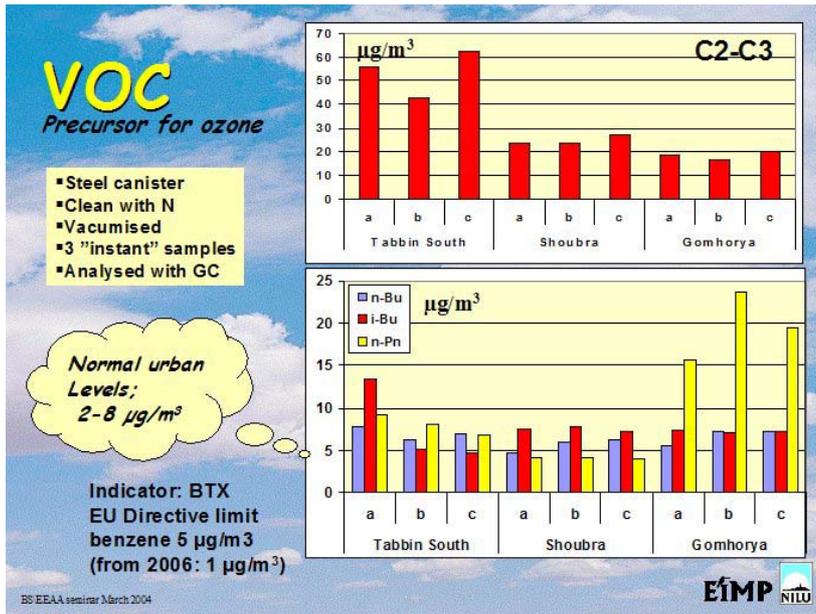


Figure 2.3: Results of VOC analyses. Three samples were collected at three sites in 2002.

The concentrations at Gomhorya Street are typical for densely trafficked urban streets. The concentrations are on the high side of what is usually measured in urban areas of Europe and Canada. The n-pentane concentrations, which are high, indicate evaporation of VOC from petrol cars in the street.

2.4 Lead analyses

Lead analyses on filters from the PM_{10} samplers as well as from TSP samplers are part of the EIMP programme. The first results of analyses was reported during Mission 02. Analyses performed on filters collected in 2002 is presented below.

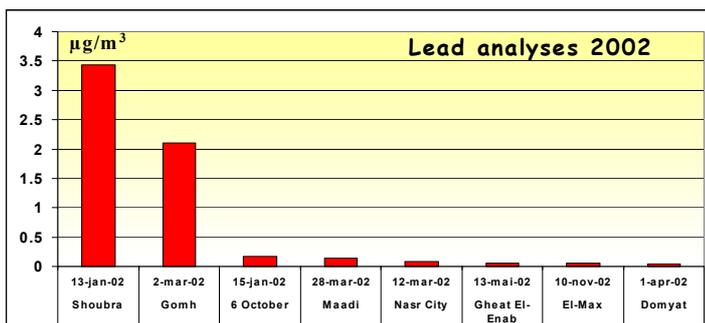


Figure 2.4: Lead concentrations (24 h average) analysed on PM_{10} filters.

The highest concentrations were found at the industrial site at Shoubra and in the street canyon at Gomhoreya street. Both these sites would exceed limit values, even if these limits are given for annual average concentrations only.

2.5 Meteorological data

Problems measuring temperatures, wind direction (WD) and wind speeds (WS) have been identified before. The problem does not seem to have been less. Only in the Cairo area we have seen good quality meteorological data. The wind direction frequencies as presented in the monthly report for December 2003, seem to be correct. (See Appendix D2)

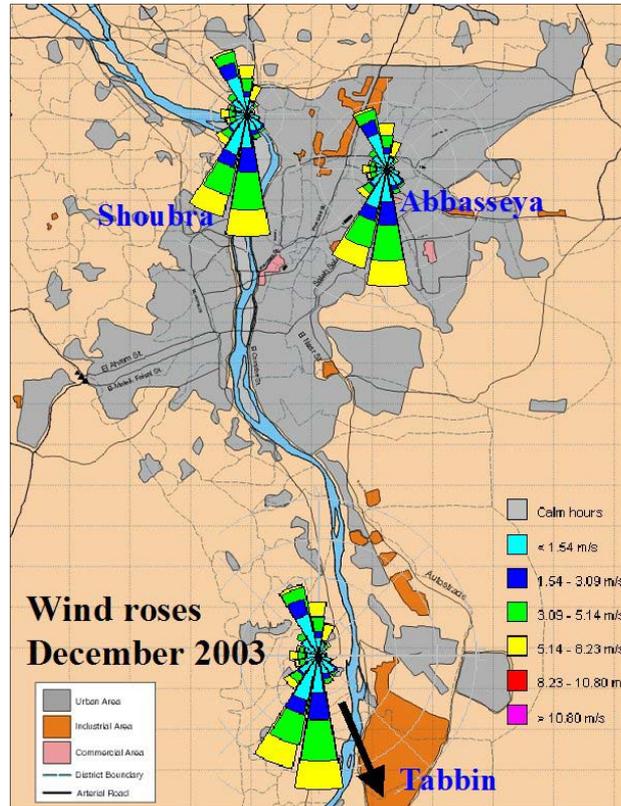


Figure 2.5: Wind direction frequencies (wind roses) for December 2003 in the Cairo area.

In the Delta as well as in Alexandria the automatic weather stations did not work properly. Meteorological data from Aswan has not been made available for the last 6 months.

Some sensors have been changed. Temperature data have improved, but some of the wind sensors seem to have expired and new sensors should replace the old ones.

2.6 Upgraded calibration system

The field calibration system was completely upgraded in the beginning of November 2003. After starting to use Working Standard Gases to make a span check every week the 145 Calibrator is only used to make zero air. It was stated after the last mission that these zero air generators had to be upgraded to give correct zero values.

Another problem identified during the installation of new calibration gases, was the fact that EEAA had only purchased 14 regulators. There is an urgent need for more regulators to enable smooth and safe operations of the calibration procedures. This

was again discussed with the Reference Laboratory representative and presented to EIMP and to the Danida ESP. (See Appendix B5)

2.7 Calibration routines

Some of the calibration gases seem to be used much faster than anticipated. At Kafr Zayat the NO_x calibration gas bottle is **completely empty!!**

It was stated that this bottle arrived at the station with a pressure of 100 bars instead of the normal 200 bars. It was assumed that there had been something wrong with the bottle, which is now empty!! The SO₂ bottle at Kafr Zayat arrived with a pressure of 200 bars. It is presently reduced to 142 bars.

It has been stated in a Memo dated 22 March 2004 that the use of working standard gas cylinders instead of the originally installed permeation tubes for weekly calibration of the gas monitors require that all regulators and valves are properly in place.

To enable a proper calibration routine, assuring that gas is not being lost in the system, it is urgently important to acquire all missing parts that were not delivered with the bottles. (Appendix B5)

We may also suggest that, to reduce the consumption of calibration gases, the weekly calibrations may be reduced to bi-weekly. Also the check of concentrations in the working standard gas cylinders was taken up again. A memo on the matter was prepared and distributed to all parties involved included the monitoring institutions. (See Appendix B6).

2.8 New sites

New sites for air quality monitoring in the city of Beni Suef was selected during the last visit. One will have to include meteorological data to enable discussions of sources and impacts. This design will enable air quality information in real-time.

Quotations have been given to EEAA concerning instruments, data retrieval and databases. Decisions have not yet been taken and

Other sites have also been evaluated as part of the new updated national monitoring programme for EEAA. A new site had been pointed out in Suez. Permissions should be prepared, and the station should be moved as soon as possible. In Alexandria the shelter and instruments from AlAsafra should be moved to a new site south of Alexandria. Ask ElSayed Shallaby to perform the re-installation.

3 Reference Laboratory

3.1 QA/QC and Audit programme

Audits from NIS have been undertaken as a routine programme. There had been delayed in the audit programme due to payment problems from EEAA during the last months of 2003. Presently, however, it was stated that the Audit programme went according to schedule.

3.2 Check on calibration monitors- NOx

NIS had reported problems with the NOx analyser. Rolf Dreiem visited NIS to check the monitors and found several errors, which were corrected. The fuses that have been installed by NIS were the wrong type and they had been burned. There was no flow on the ozone-generator, even if the instrument indicated that the flow was OK. Rolf cleaned the orifice and afterwards corrected the flow sensor, which had been installed upside down. After corrections the NOx analyser was working fine.

To verify the instruments NO was produced from the multi-calibrator at zero and 800 ppb. These concentrations were then analysed by the NOx analyser from CEHM (Kaha) and be the NIS analyser corrected. No calibration was undertaken on the analysers. The calibration system at CEHM and NIS was working almost exactly similarly; the result was within 5%. This is acceptable as a quick test. The travelling standard NO cylinder was also used to check both analysers. The result was within 8%. The conclusion after these tests performed without new calibrated instruments, short warm-up time for the calibrator and analysers proved that the calibrators as well as the analysers at NIS and CEHM is working satisfactory at both places.

4 Reports

4.1 Daily reports

Daily reports of the air quality in Cairo are still being produced and presented to the minister's office. The reports, which includes the maximum one-hour average concentrations of SO₂, NO₂, PM₁₀, CO and Ozone was used to verify potential errors in the data.

Questionable data were identified for NO₂ at Maadi, PM₁₀ at Abbaseya, and NO₂ at Gomhoreya Street. There were also some missing data from ElKolaly.

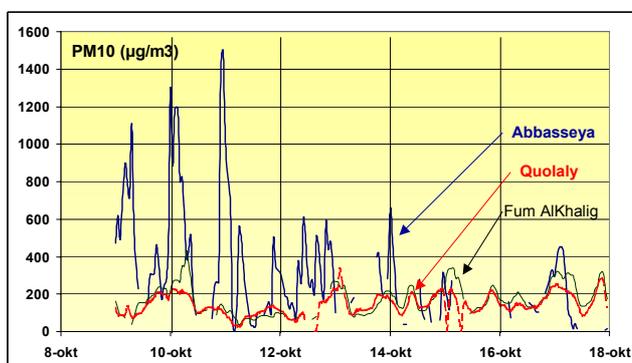
4.2 Monthly reports

A data summary report issued every month in Arabic language presents the air pollution concentrations based on preliminary data. A short version of the report for December 2003 is presented in Appendix D.1.

High concentrations of SO₂ had been measured at central Cairo sites and in some of the industrial areas. This is normal, and analyses of the long-term concentrations and trends of SO₂ in the greater Cairo area has revealed that the SO₂ levels are not changing significantly from year to year.

4.3 Reporting episodes

Air pollution episodes occur over Cairo caused by meteorological conditions and by the presence of dust storms. No real episode was identified during Mission 04.



However we analysed data from the previous months and identified again the strange appearance of very high PM₁₀ concentrations at Abbaseya in October 2003. It turned out after analysing the data that there was an error in the measurements. After visit by Rolf to the station on 14 October 2003 the error was corrected and Abbaseya data were measured at levels similar to other sites. However, a different

error had been introduced some weeks later, and this error was not corrected until during Mission 04.

4.4 Quarterly reports

Quarterly reports were presented by CEHM and IGSR for the fourth quarter 2003. The reports were evaluated and corrected by B Sivertsen. They were presented to the Monitoring Institutions again and some on-the-job training in data interpretation and data evaluation was undertaken.

The conclusions from the IGSR report were especially discussed, and were changed to reflect the findings of the report.

4.5 Papers and publications



The air pollution monitoring network for Egypt

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The Egyptian Environmental Affairs Agency (EEAA) has been supported by Danida to establish an Environmental Information and Monitoring Programme (EIMP) for Egypt. Experts from the Norwegian Institute for Air Research (NILU) were appointed responsible for the development of the national air quality monitoring programme. This programme consists presently of a total of 42 measurement sites covering most of Egypt.

The monitoring programme

The air quality monitoring programme designed and established by the EEAA includes:

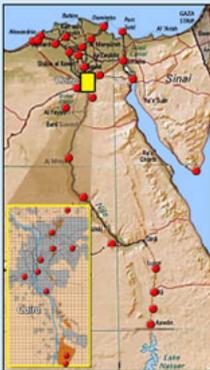
- Data collectors, sensors and monitors
- Data transfer systems and data quality assurance/control procedures
- Data bases including data statistics and
- Data reporting and distribution systems.

The Centre of Environmental Hazard Mitigation (CEHM) at Cairo University and the Institute of Graduate Studies and Research (IGSR) at Alexandria University are operating the sites and instruments on behalf of EEAA.

The network consists of:

- 14 sites located in the Greater Cairo area,
- 8 sites in Alexandria area,
- 7 sites in the Delta,
- 3 sites in the Canal area and
- 10 sites in Upper Egypt and Sinai

Statistical analyses and comparisons of ambient concentrations with national and international standards indicates that the main problem in Egypt is linked to suspended dust (TSP, PM₁₀ and black smoke). Occasionally we also record high levels of SO₂, Ozone, CO and NO₂.



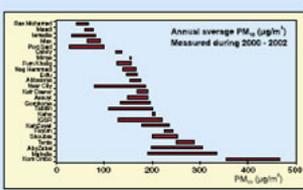
Suspended dust

Suspended dust (measured as PM₁₀ and TSP) is the major air pollution problem in Egypt.

Annual average concentrations of PM₁₀ range between 100 and 200 µg/m³ in urban and residential areas and between 200 and 500 µg/m³ near industrial areas.

Daily average concentrations of more than 6 times the Air Quality Limit value for Egypt are being recorded occasionally in the urban areas of Cairo. The natural background concentration of PM₁₀ in Egypt has been evaluated to represent levels close to or around the Air Quality Limit value of 70 µg/m³ as a daily average.



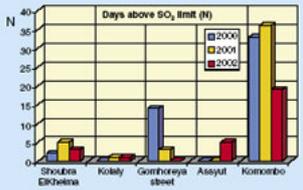


A large range of PM₁₀ concentrations are found. PM₁₀ in urban and industrial areas frequently exceed 100 and 200 µg/m³.

SO₂ and NO₂

The concentration levels of SO₂ and NO₂ have also been observed to exceed the Air Quality Limit values in industrial areas and during some occasions in the big cities.

Both the long term (annual averages) and the short-term (1-hour average) Air Quality Limit levels have been exceeded. Eight-hour average CO concentrations in streets and along roads in Cairo frequently exceeded the Air Quality Limit value. During the 4 years of data collection we have seen a trend of improved air quality in the city centre of Cairo.



SO₂ concentrations exceeding the Egypt air quality limit value occurs in the city centre of Cairo and downwind from industrial areas.

A paper titled “The air pollution monitoring network for Egypt” was presented at Dubai International Conference on Atmospheric Pollution, 21-24 February 2004, in Dubai, UAE. The presentation summarised some of the major findings from 5 years of measurements supported by Danida and EEAA.

We also prepared a poster presenting the main issues of the EIMP air quality monitoring programme. A picture of the poster is shown to the left.

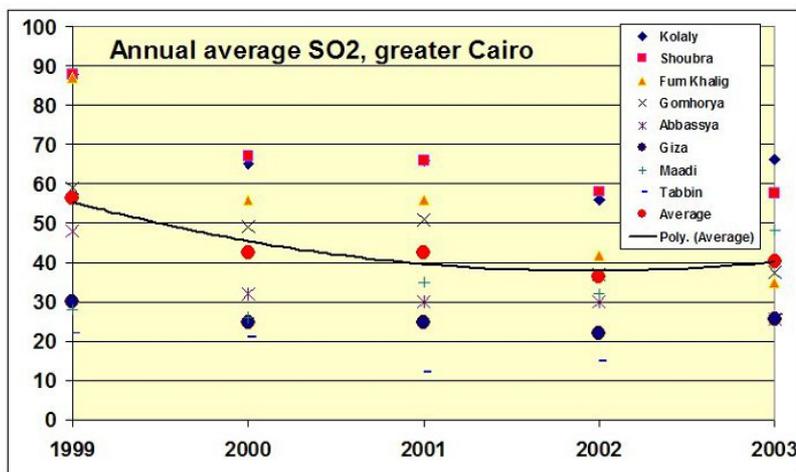
The paper as presented during the conference is presented in Appendix D2.

4.6 Newsletter

Five newsletters have been produced by the EIMP air component so far.

During Mission 04 we prepared a Newsletter concerning the SO₂ concentration levels in Egypt.

The sulphur dioxide (SO₂) concentrations measured at more than 30 sites in Egypt occasionally exceed the Air Quality Limit values as given by Law no. 4. An analysis of the SO₂ concentrations measured by automatic monitors in the greater Cairo area during the last 5 years has revealed that the SO₂ concentrations in 1999 were slightly higher than in 2003.



However, from 2001 till 2003 there have been no significant changes in the average long-term concentrations of SO₂ in the greater Cairo area. The city centre station of Kolaly still exceeded the annual average limit value of 60 µg/m³.

The complete text for the newsletter, which will be transformed to the EEAA Newsletter format, is presented in Appendix D3.

5 A national air quality network

Based on the requirements stated in the tasks and objectives of the EIMP Phasing Out Project a report titled “A National Air Quality Monitoring Programme for EEAA, Egypt” was drafted during Mission 04.

An overall objective of the air quality measurement programme is to obtain a better understanding of the urban and residential air pollution as a prerequisite for finding effective solutions to air quality problems and for sustainable development in the urban environment. A more detailed first description of some of the objectives was presented in Appendix E.1 of Mission 02 report. (Sivertsen and Dreiem, 2003).

The main purpose of the air quality measurements will be to identify the possible exposure to the public and to people in general. Information will be collected on ambient air pollution levels in areas where people live and work. To enable evaluation and assessments of air quality and to enable trend analyses a network of **fixed stations** is needed.

5.1 Updating the network

Improvements and additions to the existing EIMP network have already been prepared and effectuated during the Phasing-out Phase. New monitoring sites, improvements at existing sites as well as new procedures for field calibrations have been introduced. In the description of a National monitoring system we will also try to prioritise sites and locations. It may be possible to reduce the total number of sites, especially if models are added to the monitoring and assessment system.

5.2 A sustainable monitoring programme

On request from the EEAA/EIMP project co-ordinator a memo was prepared stating the requirements and costs related to keep the existing EIMP air quality monitoring programme sustainable in the future. A rough cost estimate indicates that the annual cost for the future operations of the EIMP programme will be about 2,2 million Egyptian pound. This includes operations, consumables and renewals of instruments that have expanded their lifetime. (See Appendix E1)

6 Air pollution management

Air quality assessment and management has been part of the EIMP Phase out programme during the last two years. The limitations at EEAA are clearly revealed when management and impact assessment has to be performed. Presently there is a total lack of expertise that can perform air quality modelling related to the good quality data that are collected by the EIMP/EEAA monitoring programme.

6.1 Air quality management needs

The best approach to meet the needs identified by EEAA will be to start preparing the tools for performing an air quality management planning system to prepare an extensive assessment study and to prepare a master plan for air quality in Cairo. The tools for such planning including optimal abatement strategy planning are available.

So far there has been a “wait and see” attitude to the problem from EEAA and from Danida. Other countries and large urban areas world wide is now combining the modern on-line monitoring systems with modelling capabilities, which enable them to identify and quantify the most cost-effective solutions to improve the air quality. If there were one city in the world, which would need such an approach, it has to be Cairo!

Responses from some of the administrative personnel within the EEAA building stating that these systems are far too advanced for EEAA is based on inadequate knowledge about solutions and approaches of this kind undertaken in other developing countries.

7 Training needs assessment

The training of personnel at EEAA and at the Monitoring institutions at CEHM and IGSR consist of:

- Seminars
- Workshops
- On-the-job training

A main seminar was scheduled to be organised at CEHM Cairo University on 22 October 2003. This was postponed due to time constraints, and the seminar was held at EEAA during Mission 04 (see below).

7.1 Seminar

A seminar titled “Air Quality of Egypt, Data and Interpretations” was prepared and held at EEAA 21 March 2004. The seminar updated all participants in the air quality monitoring programme in understanding the measurements and the results obtained from the measurements. Quality assurance needs as well as errors and malfunctions were also part of the discussions.

The programme for the seminar is presented in Appendix F1. A total of 26 experts participated in the seminar. (See Appendix F2). The participants received a Certificate confirming their participation.

A collection of documents including the measurement programme description and the discussion of results as presented in the Dubai Paper (Appendix D2) was given to the participants in a file. The file also included the pictures presented in the seminar as shown in Appendix F3.

7.2 On-the-job training

On-the-job training related to the operations and maintenance of instruments as well as interpretation of data was followed up during Mission 04. The instrument repair training was interrupted by the illness of Rolf. This will be taken up again in September 2004.

8 Administrative work

The EIMP programme has in some respects been limited by attitudes, strange decisions and mistrust, which in many cases unable the progress of the project. The reasons may be related to the limited amount of money and funds made available by EEAA, but I also believe that the personal attitudes contributes to some of the problems.

Some of these constraints were discussed during the End of Mission meeting between the expatriate task manager, the EEAA counterparts and Ahmed Abou ElSeoud. An example of limited responsibilities is the handling of the spare parts that is available in the storage at EEAA.

8.1 The access of spare parts from the storage

There is a storage room of spare parts at EEAA that was purchased by Danida to be used by the monitoring institutions for operation and maintenance of the measurement programme. I have been asking Haytham several times to give me a complete and updated list of spare parts available in the storage. This has not been possible and neither of the counterparts have an updated overview of what is available in the unorganised pile of expensive and inexpensive parts in the storage. In the meantime aging is damaging some of the parts, and the project may be loosing valuable equipment worth thousands of pounds.

The monitoring institution at CEHM does not know what is available and have to purchase NEW parts instead of having directly access to the storage. Some parts were released with the support of expatriate expert Rolf last year, and these parts are nicely stored, marked and organised by instrument at CEHM together with parts that have been purchased lately. This storage meets the requirements of a spare part storage, which the EEAA storage does NOT.

It was reconfirmed at the moment I left the office on 24 March that the list that was available was NOT updated, and there was no indications of what was available. It has been proposed that at least all parts made by rubber, such O-rings, paddings and linings, repair sets for pumps etc should be released to CEHM as soon as possible. Why not release the whole storage to CEHM at this time. They may also be able to prepare a complete list of the spare parts available, they will organise it and the project may save money in the future.

8.2 A sustainable air quality programme, at what cost?

The EIMP air pollution monitoring programme has been a long process of procurement, installations, repeated training of several counterparts and continuous on-the-job training at all levels. To continue operating this programme as to day with adequate quality and confidence will require that:

- Experts that have received training stay with the future EEAA air quality monitoring programme
- Instruments, databases and equipment are kept updated and in good quality
- Spare parts and consumables are made available in good time before needed
- Quality assurance programmes are kept at the level originally established.

A memo was presented illustrating the need for funds adequate for upgrading and keeping the operations at the same level as the EIMP programme as of to day. An annual cost of 2,2 million LE was the result of these discussions. The memo is presented in Appendix E1.

8.3 New air quality limit values for Egypt

An upgrading of the air quality limit values for Egypt has been discussed in several meetings during the EIMP programme. In October 2003 Chemonics International under a USAID contract proposed a revision of maximum limits of outdoor air pollutants. A draft document was released on 14 October 2003. This memo briefly summarises some of these proposals.

Some references to EIMP documents as well as the proposed new limit values is presented in Appendix G1.

8.4 Meeting with Danida ESP

A short meeting was called by Anders Bjørnehave at the ESP to discuss the status of the components present in Cairo at the moment. He also wanted to get some input about the status of the complete EIMP Phase out project. These matters were discussed with COWI, and a feedback from Karin Rothman Hansen and Anders Randløv stated that Morten Andersen, who will be back from holydays next week, would contact Mr Bjørnehave as soon as possible and give the total status.

Analysing the time schedule for the different components of the EIMP Phase Out Programme issued by COWI on 13 February 2004, it seems as all component are on schedule. There are about 6 man months of work remaining as of 23 March 2004, and the project will be terminated at the end of the year.

The air component met an unforeseen problem. After one week of fieldwork Rolf Dreiem had a heart attack and had to return to Norway. His work will be taken up later during the year and terminated in October as scheduled.

Mr. Anders Bjørnehave pointed out at the end of the meeting that there is NO money available for this project from Danida anymore. The responsibility for keeping up the programme in the future will totally be at EEAA. It is therefore important that the EIMP Phase Out project coordinator manage to convince the EEAA top administration that this is the “bottom line”. Mr Bjørnehave also pointed out that all requests for additional funds are channelled through the main contractor.

8.5 Meeting at End-of-Mission

In the meeting with the counterparts and with Ahmed Abou Elseoud at the end of the Mission several items were discussed, as mentioned above.

A list of topics that should be followed up was also presented and discussed.

This list included topics such as:

- The storage
- Some shelters need repair
- Identify calibration gas bottles that are being emptied.
- Get complete overview of available gas from the monitoring institutions
- Prepare purchase of more gas for the near future operations.
- Working standard regulators specified in memo of 22 March should be ordered.
- Sequential samplers performance; CEHM must measure SO₂ in bubblers installed behind the filters.
- Prepare moving shelter and instruments from AlAsafra to new site south of Alexandria.
- Move the site in Sues!! The new site has been selected, get allowances and MOVE!
- VOC sampling programme has to be followed up. Continue sampling at ElShouhada, ElMax, Damietta and ElGomhoreya Street.
- Upgrade meteorological sensors.

Both counterparts will follow up these tasks. The Newsletter on SO₂ in Egypt will be finalised, and continuous contact will be held between the counterparts and the Air Quality Task Manager.

9 References

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Appendix A

People and schedules

Appendix A.1 People we met and colleagues (March 2004)

EIMP office, 3 EEAA Building, 30 Helwan Str. Maadi, Cairo (behind Sofitel hotel) ,

Tel. 202 525 6474 ext. 7223, Fax: 202 525 6467, E-mail: eimp@intouch.com

Staff: Ahmed AlSeoud (EEAA. tel: 0123102068, 5721289),

aahmed_hm@yahoo.com

Air: B Sivertsen (Task Manager), tel. 351 1615, Dreiem, Ahmed About Elseoud (AAE), Ashraf Saleh Ibrahim (ASI), , Khaled Hamdy (KH), Ayman El-Maazawy (AEM), Mohamed Awad Shendy (MAS), Al Shabrawy Mahmoud (SMI), Hossam El Shakhs (HS), Mohamed Kassem (MK), (In Germany: Haytham Ahmed (HAA(p: 320 2078)), Mai Ezz El din Ahmed (MEA)

CEHM / Cairo Univ, tel 571 9688, Fax; 571 9687: Dr Sharkawi, Dr. Mortallah, (Dr. Yehia Abd El Hady) Dr Tarek El Arabi (Project Manager) mob: 0123484050, TMELARABY@hotmail.com

Staff: Ashraf Saleh (data retrieval), Dr. Essam Abdel Hallin (data retrieval), Mahir Sayed Hafez (Tabbin), Ahmed Sayd (Qualaly, Gemhoroya), Yassin Fathi (Giza CU, Fumm al Kahlig), Kamela (Mon.lab., Shoubra), Ahmed Sulamen (Chem lab head), Ameni Taher (Chem. Anal.).

IGSR Alex Univ, tel: 03422 7688, lab: 03 422 5007, Proj. tel: 424 1485, Fax 203 421 5792 , Dr M El-Raey tel: 0123109051 (elraey@cns.sisnet.net), Dr. El Sayed Shallaby, Shawkat K. Guirguis (QA) (aplal@igsrnet.net), Dr Zekry Ghatass, Ashraf A Zahran, Mohamed Rashad Hossam A Said, Heba Said,

Data Management: Jacob Andersen, Hossam ElShakhs, Ayman El-Maazawy, Mohamed Shendy

Coastal Water: Arne Jensen, Erling, Ole, Al Shabrawi Mahmoud

Reference Lab: Ulla Lund, (Street 13 Maadi) tel: 012 312 0951, Mai EzzEldin Ahmed (counterpart), Fleming Boysen,

EEAA, Dr. Mohamed Said Khalid (Chairman), Dr Mawaheb, Mrs Hoda Hanaffi (head of GIS), Dr Mahmoud Nasrallah

Meteorological Authority (EMA): Dr. Ahmed Adel Faris (Deputy Chairman), Dr. Mohamed M. Eissa (Dir. Gen. Information), Dr. Rabiee El Fouly (Dir Gen. Research), Dr. M.A. Abbas (Dir Gen for Instruments and Laboratories),

Sofitel Hotel: Maadi, Tel: 526 06011, Fax: 202 526 1133

Ambassador: Norge: Al Gazira al Wusta str. Amassadør Bjørn Frode Østern. Vivi Heck 735 3340

Maadi: Oystein Rismyr 44 Road 20. Apt 4, 753 0007

Danmark: 12 Hassan Sabri, Zamalek, John Carstensen 378 2040

COWI: 00 45 45 97 22 11

Danida: Jørgen Simonsen, 21 Road 86/Mustafa Kamel, P: 358 6167, Mob: 012 214 1759

USAID - CAIP: Jim Howes, Monir Labib, Jennifer Baker (Training) , Kirk Stopenhagen

Mrs Ekhlas Gamal ElDin, Hani, Said, Mike Smith

CTS: Amr ElSoueini, tel: 378 2908, Fax: 350 4977, *Mobile: 012 216 6670*, Ali Hamed

EMC Bill Hayes, Steve Gersh (Vice President), Fax: 805 544 1824, (sgersh@emcslo.com)

Mohammed Nasar (AQ) , tel 351 5174, Canal Street 3, Maadi

Giza Pyramids: Dr. Hawas, Ahmed El Hagar, **Sakkara:** Mohammed Hagra, Hamdi Amin

Saddam driver: 012297 189, **Ahmed driver:** 010 113 7410, p:023296259

BS: Flat: no.4 103 Street, Mahmoud Taha, mob: 012 341 3899, priv. 5255743, leil. 3.etg. 5255743

Appendix A.2: Programme for Mission 04, March 2004

Mission 04, 2 to 26 March 2004 includes the following items and concerns both B Sivertsen (3 weeks) and R Dreiem (3 weeks):

- Audit to all sites (RD)
- Inspect instruments (RD)
- Check QA/QC procedures (BS/RD)
- Continue training in maintenance and repair (RD)
- Give a seminar on understanding and reporting the data (BS)
- Prepare another newsletter (BS)
- Train EEAA staff in data interpretation (BS)
- Prepare input to State of the Art report, air quality trends (BS)
- Prepare ONE national network (report) (BS)
- Design updated network and discuss optimising the network (BS/RD)

The seminar is scheduled for 21 March, and will contain presentations and discussions of measurement results.

The quality and content of data will be investigated specifically. The reason is that it is assumed that the QA/QC procedures have not been followed during a period of payment delays.

Preliminary content of Mission 05

Mission 05 in October 2004 will include R Dreiem (1 week) B Sivertsen (4 weeks)

- Final inspection of paper work for all sites at CEHM (RD)
- Update final EIMP network (BS)
- Status National network (BS)
- Reports and air quality in Egypt (BS)
- Final reporting to Danida (BS)

An additional Mission may be undertaken in August to prepare the database in a final form.

Appendix B

Status measurement programme

Appendix B.1: Memo from R. Dreiem



Work Notes March 2004

- 4 March 2004.** Travel to Cairo. Arrived in Maadi at 17:30 pm.
- 5 March 2004.** Evaluated and studied the last Mission report and prepared temporary plan for this mission.
- 6 March 2004.** Had a meeting at CEHM. Discussed all CEHM measurement sites. Made a priority list of the work to be done at the sites the next days.
- 7 March 2004.** Went to CEHM. Tried to solve the problem on Ozone Analyser from Aswan. Cleaned and changed the position of measurement tubes. To low energy output from UV-lamp. Changed.

Visit to NIS with Yassin and Ahmed.

NIS had a problem with NO_x analyser. First we found that the fuses were wrong type and had been burned. Next was no flow on the ozone-generator. Instrument said flow OK. Cleaned the orifice and afterwards corrected the flow sensor that was installed upside down and reported flow OK even if it was no ozone flow. This was corrected and the NO_x analyser was working fine.

From the multi-calibrator zero and 800 ppb NO were produced. These concentrations were then analysed on NO_x analyser from CEHM (Kaha) and the above NIS analyser. No calibration was made on analysers. This was done to see if the calibration system at CEHM and NIS is working the same way. The result was within 5%. This is acceptable as a quick test. We also used a travelling standard NO cylinder to check both analysers. The result was within 8%. The conclusion after these tests performed without new calibrated instruments, short warm-up time for the calibrator and analysers tells us that the calibrators as well as the analysers at NIS and CEHM is working satisfactory at both places

8 March 2004. Went to **Abbasaya** to check the PM₁₀ monitor, which has given strange results for several weeks. The gasket filter tape to filter house do not look good. Check if house is in closed position when sampling. Dust spot do not have a sharp edge. PM₁₀ air intake does not have 2 O-rings, and silicone seal is missing after last cleaning. It is important to repair this leaks to have a PM₁₀ cut off.

Funnel is missing on SO₂ air intake. New ones at storage.

Gomhoreya measurements site: NOx monitor is turned off. There are no calibration gases available at this site. CO gas flow is low. Capillary needs cleaning. The air intake fan is not working. It has to be replaced and air from the fan need to have a tube from the fan to outside to get rid of dirty and hot air.

9 March 2004. Met Maher in EEAA office in the morning. Went to EEAA-station. SO₂ analyser is working fine. NOx analyser gives 4 times the value stated on certificate and there is not alarm on NOx instrument. Has to be taken to CEHM for repair and calibration.
After lunch office work.

14 March 2004. Sent home to Norway due to the need hospitalisation. Had a heart attack on 11 March 2004.

Appendix B.2: CEHM-meeting



Environmental Information
and Monitoring Programme
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Memo

Date: 7 March 2004

To: Ahmed Abou Elseoud (AAE),

Copy: Haytham Ahmed, Ashraf Saleh Ibrahim, Tarek El Arabi

From: Bjarne Sivertsen (BS)

Status air quality monitoring CEHM, March 2004

Introduction

The EIMP air quality monitoring programme had problems in the daily performance and quality assurance during the first two months of 2004 due to delayed payments from EEAA. The matter was discussed in a meeting at CEHM on 6 March 2004, to identify the consequences of these problems on the air quality database. This memo summarises the situation and status concerning data availability.

Problems due to lack of payment

Until 10 February 2004 no payments had been transferred to CEHM since the first quarter of 2003. The team at CEHM performed all work according to the Contract without the necessary money for a total of 11 months. As of 1 January 2004 the operators had not received salaries since July 2003 (April, May, June paid from CEHM).

Transportation, telephone lines, air condition and consumables were paid from CEHM until November 2003. Filters for High volume samplers were delivered by a local dealer and could not be paid. CEHM was blamed and accused for being a bad customer, while EEAA went free for any negative image.

Dr Mowaheb was contacted at the end of January 2004 and informed that there was a "strike" among the operators, who did not want to work any longer without salary. After discussions concerning the future payment CEHM decided to keep up the measurements with a limited input of work.

All visits to Upper Egypt were, however, stopped from November 2003, due to lack of petrol and transport money

Quality control and data availability

The sites in Upper Egypt were not visited from November 2003 till March 2004. During some of this period the most important data from Aswan and Assyut were collected automatically, and a quality check will be performed as soon as the data have been retrieved from the stations.

All sites in greater Cairo area have been operated. Visits have been paid to most of the sites during the whole period. Some sites had to be skipped due to transportation problems from 1 January till about 20 February.

All samplers have been operated as normal, and all chemical analyses have been performed. There does not seem to be significant loss of data of this kind during the period.

The Quarterly Report for the fourth quarter 2003 has been prepared and evaluated by B Sivertsen. The data availability for this period seems to be slightly less than for previous Quarters, but data is available from all sites. A more detailed summary for the period December 2003 to March 2004 is presented below.

Data from December 2003 till March 2004

The following brief status of data from December 2003 to March 2004 can be given:

	Site	Area type	Comments and Status
1	El-Kolaly	Urban centre	December good quality, PM ₁₀ missing for 2 weeks January : SO ₂ and NO ₂ okay, PM ₁₀ one week problems? Aircon problems. February: SO ₂ and NO ₂ okay till 20 Feb. PM ₁₀ okay except one week (hanging)
2	El-Gom horiya.	Street canyon	December good quality, SO ₂ strange for 10 days? January : Good quality data, NO ₂ missing 2 weeks (monitor at NIS) February: SO ₂ and CO very good. NO ₂ at NIS
3	Abbasseyia	Residential.	December: Very good quality January : Good quality data, PM ₁₀ some strange features (peaks). Impactor has been cleaned later. February: Good quality data.
4	Nasr City	Roadside/ Res	Station operated as normal (sampling undertaken).
5	El-Maadi (EEAA)	Residential	December: Data are available, SO ₂ too high till 10 Dec, NO ₂ too high from 13 Dec. January : Good quality data. February: Good quality data, NO ₂ some very high peaks, will be investigated
6	Tabbin	Industrial	December: Good quality data January : Good quality data, .SO ₂ high peaks low average, correct? February: Good quality data, but monitors will be sent to NIS in March for routine checks.

7	Tabbin south	Industrial	All data are available and in normal quality.
8	Fum Al-Khalig	Road /urban	December: Good quality data January: Good quality data February: Good quality data, but PM ₁₀ monitor had no data from 1 to 22 Feb, due to pump problems. Monitor has been checked now.
9	Abu Zabel	Industry/Res	Operated as normal, data available
10	Shoubra El-Kheima	Industrial	The station had problems with the hard disk, and the server has been at EEAA for repair for one month. New hard disk will be purchased and installed beginning of March. (See comment below)
11	Giza, Cairo University	Residential	December: Fair quality data except missing SO ₂ , and O ₃ for 2 weeks January: Good quality data February: NO ₂ and O ₃ good quality data, SO ₂ strange patterns. SO ₂ monitor has been retrieved for repair and calibration
12	Kaha	Regional Background	December: Ozone good quality, PM ₁₀ very high levels (have to be checked), NO ₂ missing from 8 Dec. January: Ozone good quality, PM ₁₀ malfunctioning due to mechanical error on tape, No NO ₂ data, monitor collected, repaired and will be brought to NIS on 7 March. February: Ozone too low from 5 to 18 Feb. PM ₁₀ malfunctioning, no NO ₂ data. Met data very good for the whole period.
13	6 October	Res/ industrial	Operated as normal, site location should be evaluated
14	10 Ramadan	Residential	Operated as normal, sequential sampler has been at NIS for routine calibration
15	Suez	Res/urban	Air condition out of order, could not be repaired – no money. All monitors will be taken to CEHM for repair and check on 7 March
16	Port Said	Residential	Operated as normal
17	Ismailia	Residential	Operated as normal
18	El Fayum	Urban	Operated as normal
19	El Minya	Urban/Res	No data since November 2003
20	Assyut I	Res/Urban.	Telephone line has been disconnected. Monitors will be checked and returned in March. Any data available from diskettes will be investigated later.
21	Assyut II	Residential	No data since November 2003
22	Naga Hammadi	Industrial/res	No data since November 2003
23	Luxor	Urban/res	No data since November 2003
24	Edfu	Urban.	No data since November 2003
25	Kom Ombo	Industrial	No data since November 2003
26	Aswan	Urban/res.	Some data available till mid November Data is being retrieved on diskettes and will be investigated.
27	Ras Mohamed	Background	Operated as normal

Comment: According to the Contract spare parts, such as the server that broke down at Shoubra, is the responsibility of EEAA. CEHM will have to specify and request the parts and then order in the name of EEAA. EEAA will pay these items after receiving the invoice.

Estimated data availability for Greater Cairo

Based on the data records presented from the databases at CEHM, a rough estimated has been performed to evaluate the overall data availability for the greater Cairo measurement sites. The results are presented in the Table below.

	Data availability (%)		
	Dec. 03	Jan. 04	Feb. 04
Kolaly	75	70	70
Gomhoreya	90	80	65
Abbaseya x)	99	90	95
Maadi	20	92	90
Tabbin x)	85	98	99
FumAlKhalid	85	99	82
Shoubra	20	0	0
Giza	65	98	65
Kaha x)	60	80	65
Overall	67	79	70

x) Meteorological data included

The statistics presented above only applies to automatic monitors, from which data are retrieved via telephone lines. The availability of sampler data is expected to be much higher than the numbers presented in the table.

As seen from the rough estimate of monitoring data the overall availability was slightly less or similar to what has been reported in previous Quarterly reports. The main reason for the lower average was missing data from Shoubra, which was due to disk problems

Deduction of payment

Taking all matters into account I believe that the deduction of money from the Contracted budget agreed upon between EEAA and CEHM will be minimal. CEHM has performed well considering the considerable delay in payment from EEAA.

The following items could be considered in this process:

- Deduction of payment will be estimated due to lack of transport to Upper Egypt. (No cost for CEHM).
- No sampling data have been collected from 5 sites in Upper Egypt, deduct per component.
- Pay “minimum charge” for salaries as employees have for periods in January and February not been at the sites.
- Calibration of instruments has been kept up, except for sites with considerable transport costs. Efforts are now being started to upgrade and keep up calibrations. A schedule has been prepared with Rolf an external control expert. No deduction should be implemented for this reason as the situation was imposed on CEHM by EEAA.
- All chemical analyses have been performed for samplers (NO deduction)

Advance payment 2004

Both parties have signed the Contract for 2004. However, the final Contract has not been presented to CEHM. This will have to be undertaken as a basis for issuing the pre-payment contracted.

This prepayment has normally been due in March and it is important that this will be the case also in 2004. Money is needed to compensate for delayed salaries and to pay spare parts and consumables needed to operate the system.

As we have stated in earlier memos, one of the main criteria for managing and keeping the air quality monitoring programme for EEAA and Egypt sustainable is to assure that the experts trained over several years stay with their duties. This again is dependent on a continuous flow of funds for running the programme in an optimal and quality assured manner.

Appendix B.3: IGSR-meeting



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Meeting

Date: 15 March 2004
To: Ahmed Abou Elseoud (AAE),
Copy: Haytham Ahmed, Ashraf Saleh Ibrahim,
Tarek El Arabi, Elsayed Shallaby
From: Bjarne Sivertsen (BS)

Status air quality monitoring IGSR, March 2004

Introduction

The EIMP air quality monitoring programme had some problems in the daily performance and quality assurance during the end of 2003 and the beginning of 2004, as presented in the meeting at CEHM on 7 March 2004. However, at IGSR this problem with economic support did not seem to have influenced the measurement programme as it did for Upper Egypt. The money for 2003 has arrived at Alexandria University and will hopefully be transferred to IGSR soon.

The whole staff performing the field measurements at IGSR participated in the meeting on 15 March 2004. All sites have been visited regularly and data seem to be present with "normal data availability". Some monitors have been at CEHM for repair, maintenance and calibrations, but most of them seem to have been returned to the sites recently. A main problem related to the measurement programme performed by IGSR is to obtain good quality meteorological data.

All air quality samplers have been operated as normal, and all chemical analyses have been performed. There does not seem to be significant loss of data of this kind during the period.

The Quarterly Report for the fourth quarter 2003 has been prepared and evaluated by B Sivertsen. The data availability for this period seems to be slightly less than for previous Quarters. Also for January and February there are still data missing in the EEAA database. This has mainly been caused by computer problems, which hopefully will be solved in the near future. A more detailed summary of the status at all sites is presented in the following.

A brief status of the measurement programme at IGSR as of 15 March 2004.

I.D	Sites	Area type	Parameters	Comments
28	Abu Qir	Industri	SO ₂ (PS), NO ₂ (PS), NO ₂ (SS), NH ₃	All data analysed Some passive samplers lost at ElTarh.
29	El-Max Petrogas	Industri	SO ₂ (SS), NO ₂ (SS), PM ₁₀ (HV), DF	Measurements working well
30	IGSR, Alex	Urban	NO _x (M), SO ₂ (M), PM ₁₀ (M), CO (M), SO ₂ (PS), NO ₂ (PS)	SO ₂ repaired at CEHM, working well NO _x at CEHM till December, working now. CO working well. PM ₁₀ working till 25 December, Damaged, Maher informed, must be repaired. Data available only on Station Manager, retrieved on diskettes every month.
.	El-Asafra-	Resident.	SO ₂ SS, PM ₁₀ (AM) SO ₂ (PS)	All data collected Instruments to be used at new site south of Alex
32	Gheat El-Inab	Resident.	SO ₂ (SS), NO ₂ (SS), PM ₁₀ (HVS)	PM ₁₀ HV had low concentrations in October. Rolf found that the tube to the recorder had an open end and no pressure was measured on the manometer. The open end is now plugged and flow measurement is now working
33	Alexandria regional	Regional	Met, Ozone (M)	Ozone was for repair at CEHM in Jan-Feb. Now working. But data has to be retrieved by diskettes. Met station has been out of order since October, need complete over haul, New sensors for wind speed. This has high priority; Maher has to check as soon as possible!
41	El Nahda	Industria	DF	Measurements here will be terminated.
42	El-Shohada Square Station	Traffic	SO ₂ (M), NO ₂ (M), PM ₁₀ (AM), SO ₂ (PS), NO ₂ (PS)	NO_x monitor from CEHM on 26 January, working, data collected on diskettes since 1 March. The station needs a NEW external modem!! SO ₂ was calibrated at CEHM, working well since 20 Feb. PM ₁₀ is working well. System manager at EEAA from mid Jan to end of Feb.
34	Damanhour	Urban	PM ₁₀ (AM), SO ₂ (PS), NO ₂ (PS)	The station has been out of operations for 7 months due to rebuilding of bus station
35	Kafr El Zayat Kafr Elnasrya	Industrial/res.	SO ₂ (M), NO _x (M), PM ₁₀ (M), DF SO ₂ (PS), NO ₂ (PS)	SO ₂ was at CEHM for 10 days in November Returned on 20 Nov. working well PM ₁₀ has a tape problem, for repair at CEHM SO ₂ returned from CEHM, working now. There has been a pulling problem, switch changes 14 March, working? Passive sampling undertaken, working
36	Tanta	Urban	SO ₂ (SS), PS (N), PM ₁₀ (AM)	Ok, all instruments working, low SO ₂
37	El-Mahalla	Industr/res.	SO ₂ (M), PM ₁₀ (M), DF	SO ₂ data missing in Jan-Feb. Software hanging, data not recorded. Working now? PM ₁₀ working since end of Feb. System Manager at EEAA from mid Jan to end of Feb.
38	El-Mansura	Industr/res.	Met NO _x (M) SO ₂ (M) DF	NO _x sent to CEHM for repair one year ago. SO ₂ monitor working well. Met station need complete check. WD and WS was checked, may work. T, RH and rad out of function. Bring in Maher.

39	Damietta	Urban/ resident	SO ₂ (SS), PM ₁₀ (HV), NO ₂ (PS), DF	PM ₁₀ controller sent to CEHM 6 Nov 2003 SO ₂ low, not working properly, should be cleaned and serviced at CEHM?
40	Kafr Dawar	Urban/ industry	SO ₂ (SS), PM ₁₀ (AM), SO ₂ (PS), NO ₂ (PS), DF	Shelter will be moved to similar environment along the road. Site selected, 7 m above ground Awaiting letter from EEAA; Haytham!!

Comments

Loss of calibration gases

Some of the calibration gases seem to be used much faster than anticipated. At Kafr Zayat the NO_x calibration gas bottle is **completely empty!!**

It was stated that this bottle arrived at the station with a pressure of 100 bars instead of the normal 200 bars. It was assumed that there had been something wrong with the bottle, which is now empty!!

The SO₂ bottle at Kafr Zayat arrived with a pressure of 200 bars. It is presently reduced to 142 bars.

It has been stated in a Memo dated 22 March 2004 (referring the Mission 02 report, October 2003) that the use of working standard gas cylinders instead of the originally installed permeation tubes for weekly calibration of the gas monitors require that all regulators and valves are properly in place.

To enable a proper calibration routine, assuring that gas is not being lost in the system, it is urgently important to acquire all missing parts that were not delivered with the bottles.

We may also suggest that, to reduce the consumption of calibration gases, the weekly calibrations may be reduced to bi-weekly.

Pre-payment 2004

As we have stated in earlier memos, one of the main criteria for managing and keeping the air quality monitoring programme for EEAA and Egypt sustainable is to assure that the experts trained over several years stay with their duties. This again is dependent on a continuous flow of funds for running the programme in an optimal and quality assured manner.

The payments from EEAA in 2003 were very late, but have now been made available. The prepayment for 2004 has been prepared and will be made available to the monitoring institutions as soon as the last Quarterly Report 2003 as well as the annual report 2003 is presented to EEAA.

It was stated fro IGSR that these reports may be finalised already during March 2004.

Appendix B.4: VOC Measurements



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

VOC's Measurements 2004

Introduction

The EIMP measurement programme has included some selected samples of VOC performed in areas, which were expected to be impacted by organic pollution. The measurement programme in Greater Cairo during the year of 2002 was as follows:

Site	Bi-weekly ⁽¹⁾	Comment
El-Gomhoryia street	X	Inside the room
Tabbin South	X	In shelter, intake through wall
Shoubra	X	On the top of the roof

Although the sampling time originally planned was supposed to be taken on a biweekly basis, the collected samples presented in this memo were collected on random basis due to technical problems.

After operating the canisters at the different sites, samples are being analysed in the chemical laboratory of the Centre of Environmental Hazards Mitigation (CEHM).

Principle

Samples are collected with steel canisters after cleaning with pure Nitrogen and then evacuated to be sent to the site. After taking the sample, the canister is brought to a laboratory and analysed within one week. The sample cylinders are 6 litre polished stainless steel canisters. Both cylinders and pumps have been widely used and tested in both USA and Europe.

The analysis method based on purge and trap concentrator combined with Gas Chromatograph with separation on Al₂O₃ PLOT column and FID detector.

Measurements

A limited number of volatile organic compound (VOC) samples were collected in Greater Cairo area during the year of 2002. These samples were collected under varying conditions and at different locations. Three samples were collected at each site instantaneous at 30-minute intervals. All samples were collected in the afternoon between 16:00 and 17:00 hrs.

The measured concentrations are shown in the following table.

Date	Station	sample	Analysed Parameters Concentrations ($\mu\text{g}/\text{m}^3$)			
			Tot (C2-C3)	n-Bu	i-Bu	n-Pn
25 Dec. 2002	Tabbin South	1	56.0	7.8	13.4	9.2
		2	43.0	6.2	5.1	8.1
		3	62.6	7.0	4.6	6.9
19 Nov. 2002	Shoubra	1	23.6	4.7	7.6	4.1
		2	23.8	6.0	7.8	4.1
		3	27.2	6.2	7.2	4.0
29 June 2002	Gomhorya	1	18.3	5.6	7.4	15.7
		2	16.5	7.3	7.1	23.6
		3	20.2	7.2	7.2	19.4

The number of compounds that can be determined is limited due to the type of trap in use, and the limited number of compounds in the standard used for calibration. C1-C3 cannot be determined because of breakthrough in the cold trap (tests should be run for propane). The C1-C3 concentrations do not include Methane.

High concentrations were recorded for C2-C3 at all sites. At Tabbin South the concentrations were ranging from 43 to 63 $\mu\text{g}/\text{m}^3$. The reason for the relatively high concentrations could be emissions from a number of chemical factories located in the Tabbin area. The site is also surrounded by a number of brick factories with a high consumption of fuel.

The concentrations at Gomhorya Street are typical for densely trafficated urban streets. The concentrations are on the high side of what is usually measured in urban areas of Europe and Canada. The n-pentane concentrations, which are high, indicate evaporation of VOC from petrol cars in the street.

The concentrations at Shoubra seem to be in accordance to urban areas in other countries, but again we see concentrations on the high side of normal international levels. The reason may again be a combination of emissions from industrial sources and traffic on the streets surrounding the site at Shoubra.

Comment

The results presented here include concentrations of VOC; C1-C5. International limit values established both by US EPA and the European Union Directives are linked to Benzene. The results would thus be more useful if the BTX (benzene, toluene and xylene) compound were included. Also compounds in the range C5 to C9 (especially iso-pentane to determine the n-pentane/iso-pentane ratio) would be of interest. This will, however, require some new gas standards.

The amount of VOC's in the air is an important indicator on the reactivity potential of the atmosphere and the ozone producing capacity, since ozone production is mainly dependent on the amount of VOC's in combination with NOx.

It would also be helpful to see the chromatogrammes and to know the temperature programmes in use during analysis, both for the gas chromatograph and for the cold trap, as well as the type of adsorbent used in the cold trap.

Appendix B.5: Memo



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Date: 22 March 2004

To: Ahmed Abou Elseoud (AAE)

Copy: Haytham, May, Ashraf,

From: Bjarne Sivertsen, Rolf Dreiem

Working Standard Regulators

In October 2003 CEHM and IGSR started to use working standard gas cylinders instead of the originally installed permeation tubes for weekly calibration of the gas monitors.

To use the cylinders in a proper way gas regulators must be used to get correct pressure and gas flow out of the cylinders.

14 REGULATORS was bought together with gas cylinders.

12 monitoring stations are measuring NO_x and SO₂. (24 monitors!)

4 monitoring stations are measuring SO₂.

The minimum required number of regulators needed to calibrate all monitoring stations every week is:

16 REGULATORS.

In order to have atmospheric pressure in the sample line to the instruments the working gas system **must** contain the following items:

1. Gas Cylinder
2. Regulator
3. Regulator outlet valve
4. Fitting regulator outlet valve (in and out).
5. Plastic T-piece
6. Mini flow meter

The items from 3 to 6 listed above are presently totally missing in the system.

Items 3 and 4 will have to be purchased from the regulator supplier.

Items 5 and 6 may be obtained from the local market.

Conclusion and cost estimate

To enable a proper calibration routine, assuring that gas is not being lost in the system, it is urgently important to acquire all missing parts listed above. This is crucial for the new calibration system to be successfully implemented.

The missing parts have been cost estimated to about 60 000 EL.

Appendix B.6: Calibration gases



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Memo

Date: 24 March 2004

To: Ahmed Abou Elseoud (AAE),

Copy: Haytham Ahmed (HAA), Ashraf Saleh Ibrahim (ASI)

From: Bjarne Sivertsen (BS), Leif Marsteen (LM)

Calibration gases

Introduction

A question was raised from the Air Quality Component counterpart whether the gas concentrations in the calibration gas cylinders could change with time. This would in such case damage the calibration at the sites.

Also it was found that one of the calibration gas cylinders have already been emptied. A complete survey of calibration gas pressures should be requested from the monitoring institutions.

Procedures handling the calibration gases

All gas cylinders are delivered from the supplier with a certificate stating the validity period of the gas. In the EIMP project the gas cylinders used at the stations (working standards) are recalibrated periodically (every 3 months) at the station using travelling gas standards. This periodic calibration will renew the validity certificate. During this calibration any changes in the gas cylinder concentration since the last calibration can be observed.

The travelling standards are calibrated every 3 months in the laboratory using the primary reference standard gases and calibrator as reference.

By investigating the results from the 3 monthly recalibrations of both working and travelling standard cylinders it should be possible to track any changes in their concentrations.

If there are no apparent changes in the working/travelling standards concentrations it is an indication that these cylinders have not changed their contents. If the concentration has changed in some of the cylinders it is an indication that these cylinders indeed have changed their contents.

If all cylinders of the same kind, e.g. NO, have changed their contents by approximately the same proportion it is an indication that the primary reference standard (for NO) in the lab has changed its contents.

If all cylinders of all kinds, NO, CO and SO₂, have changed their contents by approximately the same proportion it is an indication that the flow controllers of the calibrator in the lab has changed their set points.

If the reference standards or calibrator in the lab is suspected of being off it can be checked by calibrating the same travelling standard (e.g. NO) at both NIS and at the University. If the results are about equal it is an indication that the reference standards and calibrator at both institutions are OK. If there are differences it is an indication that the calibration equipment at one or both institutions are giving wrong results.

Actions

The following actions have to be followed up by EEAA counterparts and by the monitoring institutions:

1. The monitoring institutions should be requested to report the pressure in all calibration cylinders installed in field. This is to indicate the status of amount of gas.
2. The field operators have to be sure that they periodically (every 3 months) check the working standards with calibrated travelling gas standards. This procedure may have been inadequately followed so far.
3. The weekly calibrations may be changed to biweekly to save some gas.
4. A plan for renewal of calibration gases should be developed.

Appendix D Report

Appendix D.1: Memo- Monthly report

Memo

Date: 3 March 2004

To: EIMP Phase out

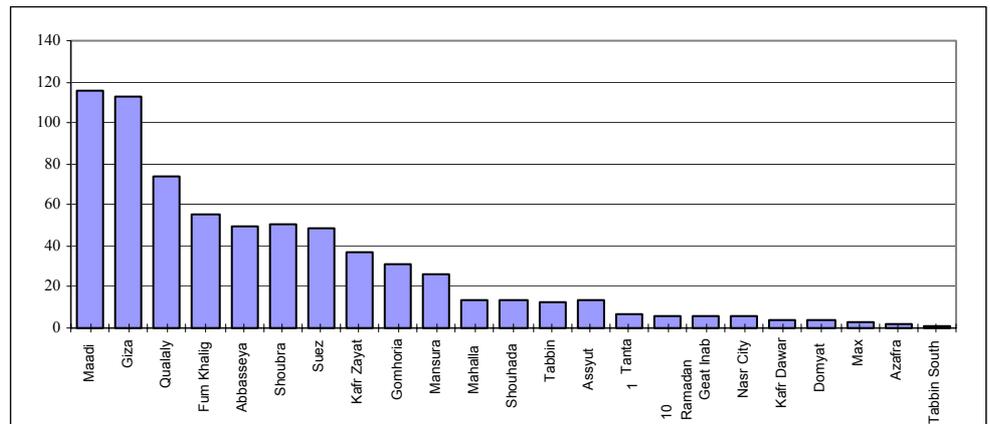
From: Bjarne Sivertsen, Ashraf Saleh and Haytham Ahmed

Monthly report December 2003- Summary

Introduction

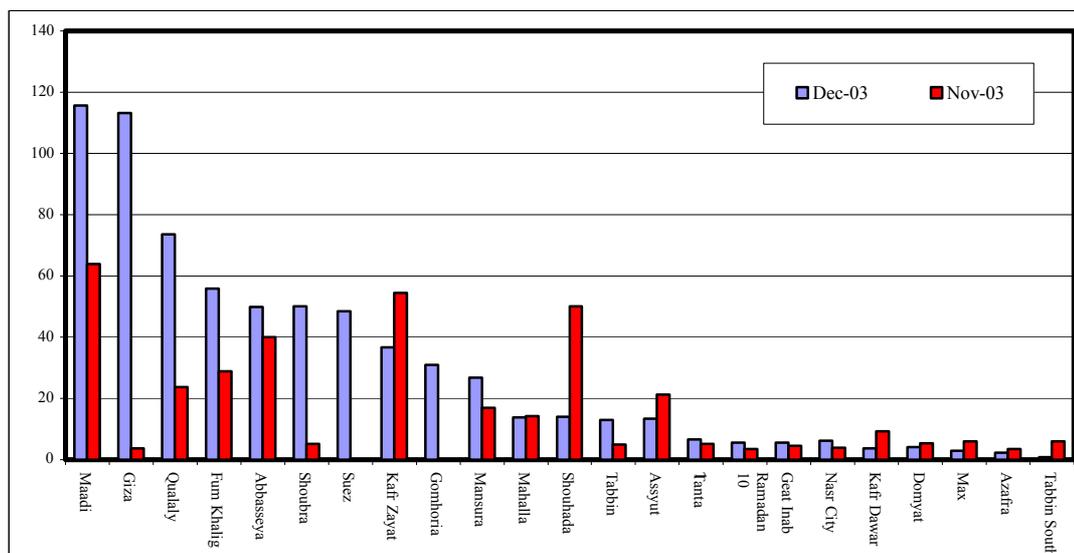
The following short summary and comments have been based on the monthly report for December 2003 prepared by **Ashraf Saleh**. The report was originally prepared in Arabic language.

SO₂ concentrations



Monthly average SO₂ concentrations at all sites in Egypt, June 2003

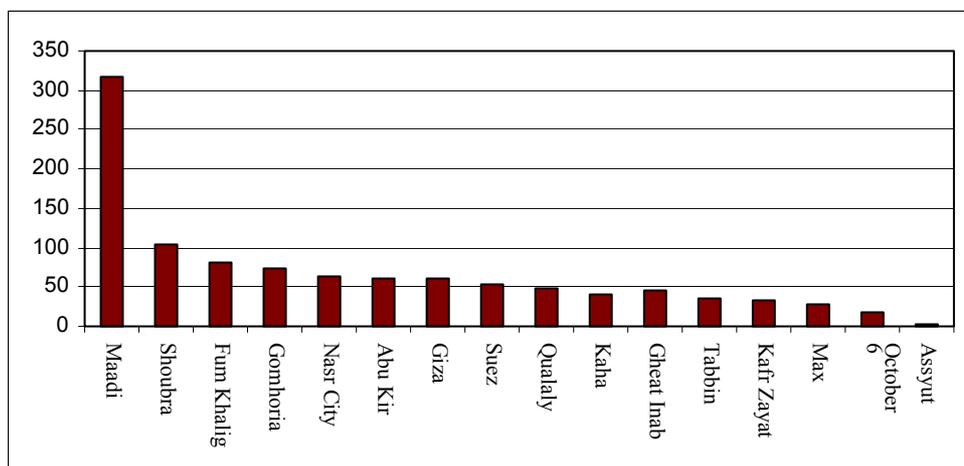
Exceedance of 60 µg/m³ (annual average AQL) was found in at Maadi, Kolaly and Giza. The data from Maadi, however, has been questioned and is being studied in more details. The monthly average concentrations at Fu AlKhalid, Abasseya, Shoubra ElKheima and Suez were between 40 and 60 µg/m³. The typical monthly average concentrations of SO₂ ranged between 50 and 100 µg/m³ in the greater Cairo area.



Monthly average SO₂ concentrations measured in December 2003 compared to concentrations of November 2003.

Concentrations at the most impacted sites were all higher in December than in November 2003. The data from Shoubra, which normally is one of the most impacted sites, were much lower than normal. These data have to be evaluated again.

NO₂ concentrations

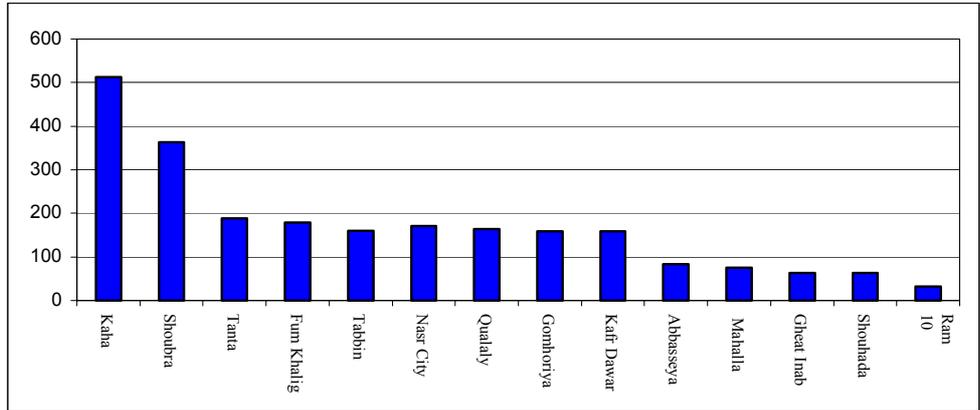


Monthly average NO₂ concentrations from 16 sites in Egypt, December 2003

Except for Maadi, the NO₂ concentrations were on the average highest in the city centre of Cairo with monthly average concentrations ranging between 70 and 100 µg/m³. NO₂ concentrations from Maadi have been questioned and will be re-evaluated. Also the city centre site in Alexandria had NO₂ concentrations giving a monthly average of 45 µg/m³.

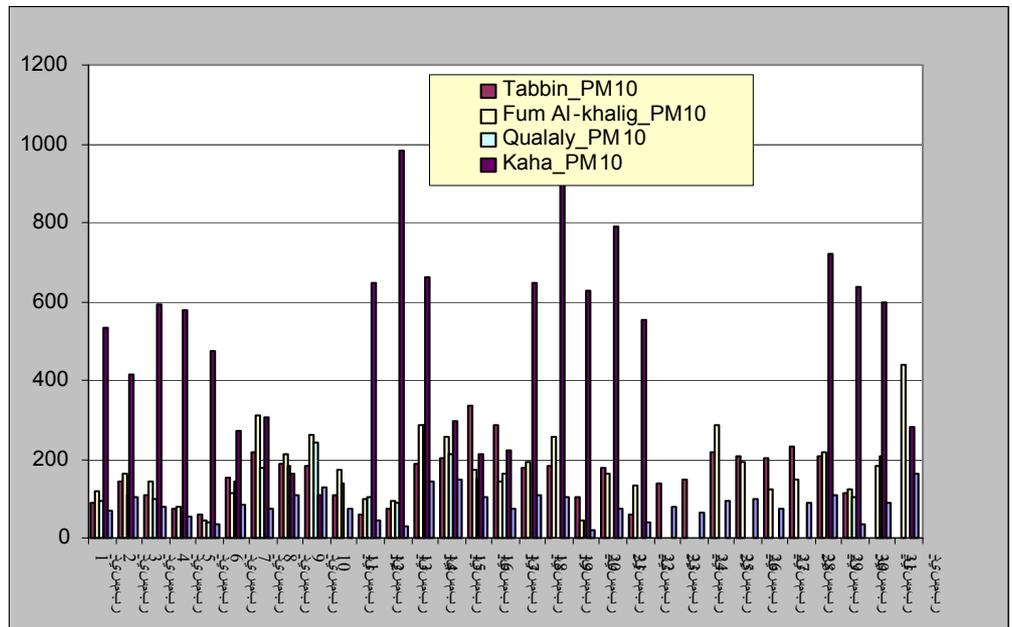
PM₁₀ concentrations

PM₁₀ concentrations are exceeding national and international air quality limit values at all sites in Egypt. The data from Kaha show exceptional high concentrations in December 2003, with a monthly average of more than 500 $\mu\text{g}/\text{m}^3$. The average concentrations measured in the urban area of Cairo in December 2003 were around 200 $\mu\text{g}/\text{m}^3$.



Monthly average PM₁₀ concentrations measured during December 2003.

The daily average concentrations of PM₁₀ are presented for December 2003 in the following Figure.



Daily average PM₁₀ concentrations at 4 sites in the greater Cairo area.

We see that the high concentrations of PM₁₀ at Kaha was measured around 12, 18 and 28 December. No other sites had unusual high concentrations during these same periods. Again we will have to investigate the values.

Only on a few days the 24-hour average PM₁₀ concentrations exceeded 300 µg/m³ at the sites in Cairo city centre. Except for Kaha the PM₁₀ concentrations exceeded more than 3 times to AQ limit value of 70 µg/m³ during 12 occasions in December 2003.

Summary of December 2003 data

Maximum one-hour average concentrations for December 2003 are presented in the following table.

	CO**	Ozone	PM10	NO2	SO2
1. Kolaly			693	169	258
2. Gomhorya	41			161	162
3. Abbassya		82	336		218
5. Maadi x)				1109	940
6. Tabbin			1108	102	39
8. Fum Khalig	18		753	225	190
10. Shoubra El K					427
11 Giza		79		138	484
12. Kaha		70	1546	104	
15. Suez				91	192
20. Assuyt1				8	35
30. Shouhada					40
35. Kafr Zayat				99	513
37. Mahalla			555		23
38. Mansura					94
	30	200	-	400	350

x) malfunctions at the station?

PM₁₀ concentrations were as always high. However some of the PM₁₀ monitors did not work properly throughout the whole month.

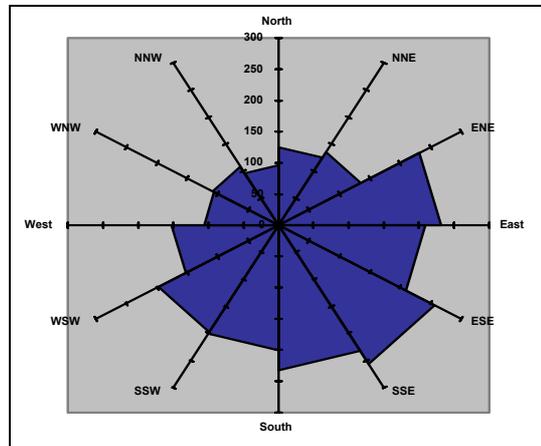
SO₂ concentrations exceeded the air quality limit value at Maadi, Shoubra El-Kheima, Giza and Kafr Zayat in December 2003.

The highest CO concentrations measured at Gomhoreya street exceeded the one hour average limit value in December. The questionable NO₂ level at Maadi was higher than limit values while NO₂ and ozone at all other sites were lower than limit values.

NO₂ concentrations at Fum AlKhalig were more than 50 % of the one-hour average limit value.

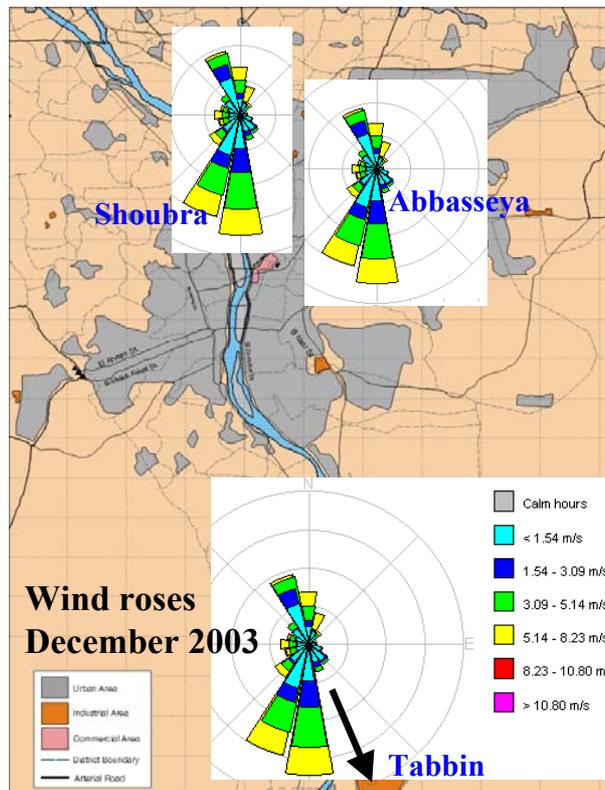
PM₁₀ as function of wind directions

The average PM₁₀ concentrations as functions of wind directions are shown in the next figure (Breuer diagram) for measurements at Tabbin in December 2003.



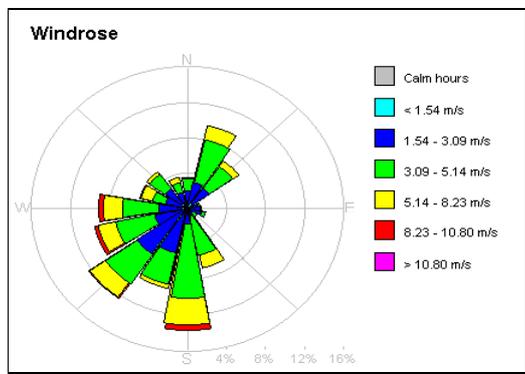
Breuer diagram for PM₁₀ concentrations at Tabbin station during 2003

The highest concentrations of Pm10 occurred for wind from around east and southeast. As seen below these wind directions occurred very rarely during December. For the most predominant wind from around south, the average PM₁₀ concentration was 200 µg/m³. This relative high impact may be due to emissions from the smelters and chemical industries located in the Tabbin South area.



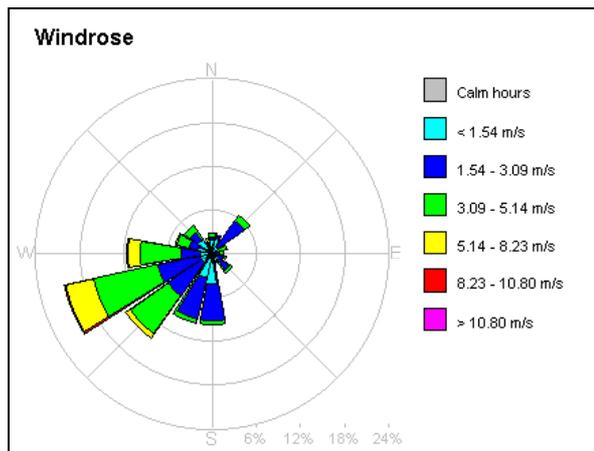
Wind roses for three sites in Cairo, June 2003.

Winds from around north were domination in Cairo during June 2003.



Wind rose from Kaha, June 2003

At Kaha the wind directions were more spread out blowing dominantly from northwest and north-northeast. Northerly winds (NNW± 45 degrees) were dominating.



Wind rose from El Mansoura December 2003

At Aswan the winds were strongly canalised from north. About 90 % of the time the winds were blowing fro N± 20 degrees.

Appendix D.2:

The air pollution monitoring network for Egypt Presented at Dubai International Conference on Atmospheric Pollution, 21-24 February 2004, Dubai, UAE

Bjarne Sivertsen¹⁾ and Ahmed Aboud El Seoud²⁾

¹⁾Norwegian Institute for Air Research (NILU), Kjeller, Norway

²⁾Egypt Environmental Affairs Agency (EEAA), Cairo, Egypt

The air pollution monitoring network for Egypt

*Bjarne Sivertsen and Ahmed Aboud El Seoud**

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*Egypt Environmental Affairs Agency (EEAA), Cairo, Egypt

Abstract: The Egyptian Environmental Affairs Agency (EEAA) has been supported by Danida to establish an Environmental Information and Monitoring Programme (EIMP) for Egypt. The national air pollution monitoring programme developed by EIMP consists of a total of 42 measurement sites covering most of Egypt. The Centre for Environmental Hazard Mitigation (CEHM) at Cairo University and the Institute of Graduate Studies and Research (IGSR) at Alexandria University are operating, on behalf of EEAA, a total of 14 sites located in the greater Cairo area, 8 sites in Alexandria, 10 sites in the Delta and Canal area, 9 sites in upper Egypt and 1 site in Sinai.

Suspended dust (measured as PM₁₀ and TSP) is the major air pollution problem in Egypt. Annual average concentrations of PM₁₀ range between 100 and 200 µg/m³ in urban and residential areas and between 200 and 500 µg/m³ near industrial areas. The natural background concentration of PM₁₀ in Egypt has been evaluated to represent levels close to or around the Air Quality Limit value of 70 µg/m³ as a daily average.

The concentration levels of SO₂ and NO₂ have also been observed to exceed the Air Quality Limit values in industrial areas and during some occasions in the big cities.

Introduction

The Environmental Information and Monitoring Programme, EIMP, was established for Egyptian Environmental Affairs Agency (EEAA) based on funds from the Danish International Development Assistance (Danida). As part of the EIMP programme a national air pollution-monitoring programme consisting of a total 42 measurement sites has been developed and established. Experts from the Norwegian Institute for Air Research (NILU) were appointed responsible for the development of the air quality monitoring programme.

The design of the EIMP Air Quality Monitoring network includes:

- Data collectors; sensors and monitors
- Data transfer systems and data quality assurance/control procedures
- Data bases and
- Data distribution systems.

The Centre of Environmental Hazard Mitigation (CEHM) at Cairo University and the Institute of Graduate Studies and Research (IGSR) at Alexandria University are operating on behalf of EEAA, a total of:

- 14 sites located in Greater Cairo area,
- 8 sites in Alexandria area,
- 7 sites in Delta,
- 3 sites in Canal area and
- 10 sites in Upper Egypt and Sinai

A brief presentation of the most important air pollution components indicates that the main problem in Egypt is linked to suspended dust (TSP, PM₁₀ and black smoke). Occasionally we also record high levels of SO₂, Ozone, CO and NO₂.

Suspended dust

Particles originate from a variety of sources such as cars, trucks, buses, factories, construction sites, unpaved roads, stone crushing, and burning of waste and wood. In Egypt a considerable amount of particles are also generated by wind action over the desert areas surrounding the big cities such as Cairo.

Thoracic particles, PM₁₀

Thoracic particles that may be transported to the lung after breathing is from a health point of view the most interesting indicator for ambient dust. These particles are less than 10 micrometer in diameter and are called PM₁₀.

Concentrations of suspended dust measured as PM₁₀ are exceeding national and international air quality limit values at all sites in Egypt. Monthly average concentrations are commonly recorded at between 200 and 300 µg/m³. Typical annual average concentrations are presented for 25 sites in Figure 1.

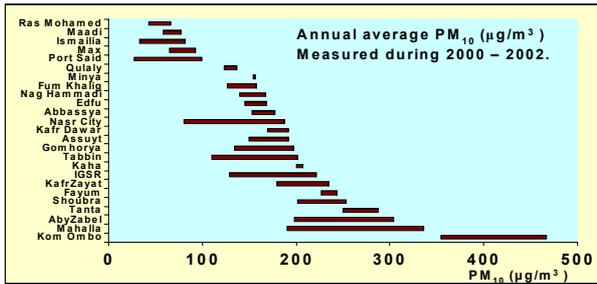


Figure 1: The range of annual average PM₁₀ concentrations measured at 25 sites in Egypt (2000 - 2002)

In the greater Cairo area the air quality limit value (AQL) of 70 µg/m³ as a 24-hour average concentration was exceeded between 45 and 98 % of the time in 2002. Similar periods of exceeding were found in 2000 and 2001.

Black smoke (soot)

Also the black smoke concentrations are frequently found to exceed the Air Quality Limit value of 150 µg/m³ as a 24-hour average concentration. Figure 2 presents the frequency of exceedance of the AQL value at five selected sites in Egypt.

At industrial sites such as in ComOmbo (downwind from a sugar factory) and in the southern Tabbin area (brick factories) the black smoke concentrations were above the AQL value during 8 to 43 % of the time annually from 2000 to 2002.

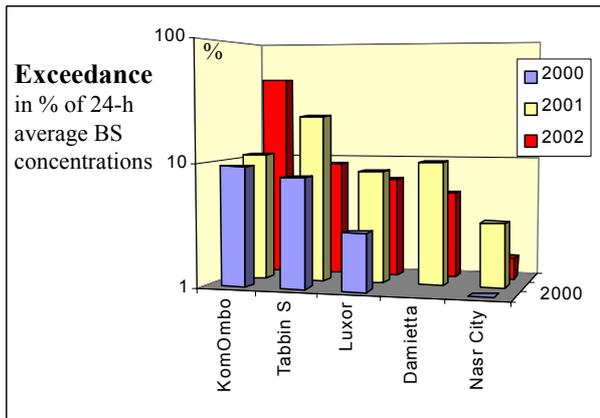


Figure 2: The frequency (in %) of exceeding the Air Quality Limit value of 150 µg/m³ as daily average concentration at 5 selected sites in Egypt during 2000, 2001 and 2002.

Measurements of black smoke in Luxor, Damietta and in a street in NasrCity show that exceeding of the daily limit values occurred also at these sites (1 to 8 % of the time).

Total suspended particles

The annual average TSP concentrations measured at 5 sites in Egypt from 2000 to 2002 is presented in Figure 3.

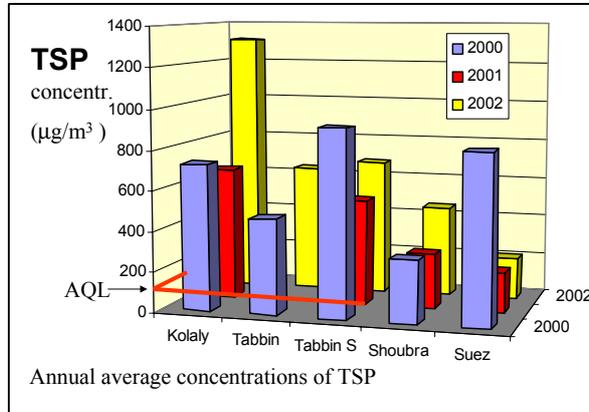


Figure 3: Annual average TSP concentrations measured in 2000, 2001 and 2002.

The Air Quality Limit (AQL) value for Egypt, 90 µg/m³ as annual average, was exceeded at all sites. Sites surrounded by traffic, industries and high activity, such as Kolaly in Cairo city, Tabbin with cement factories and other industrial activities had very high TSP concentrations. At Suez there was a significant improvement in TSP concentrations when the bus station that surrounded the site moved out of the city.

High TSP concentrations may in many cases also be generated by wind blown dust, e.g. during the Khamsin period.

Sulphur dioxide, SO₂

The SO₂ concentrations measure at a variety of sites in Egypt occasionally exceed the AQL values as given by Law no. 4. SO₂ is, however, not an air pollution problem of the same magnitude in Egypt as suspended particles. The limit values are most often exceeded in or near industrial areas and in some few cases inside urban areas as in the Cairo city centre. As an example the exceedances of the 24-hour average concentrations are presented for 5 sites in Figure 4.

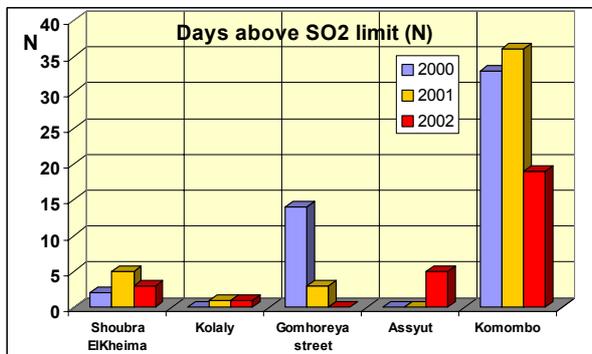


Figure 4: The number of days when the AQL values for SO₂ (24-h average) have been exceeded in 2000, 2001 and 2002 at 5 selected sites in Egypt.

Industrial areas like Shoubra ElKheima (several industries) and Kom Ombo (where the measurements are taken only 1 km downwind from a sugar factory) have revealed frequent exceedance of the limit values, while the urban stations inside Cairo only occasionally have exceeded the limit values.

Long-term average concentrations estimated from passive sampling of SO₂ are presented in Figure 5.

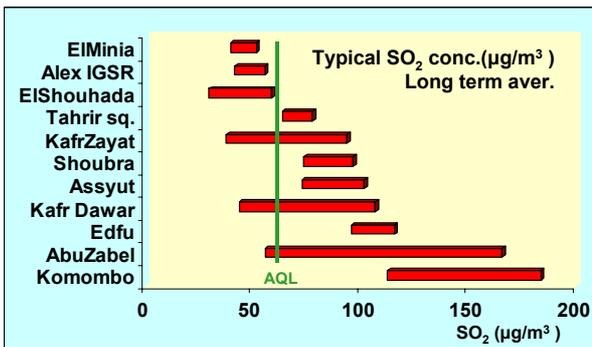


Figure 5: Typical ranges of long-term average (annual) concentrations of SO₂ measured by passive samplers at 11 selected sites in Egypt.

Again we see that sites impacted by industrial emissions are exposed to the highest concentrations of SO₂. Even at Tahrir Square, in the city centre of Cairo, the SO₂ level was slightly higher than the limit values.

Carbon monoxide, CO

Inside the city centre of Cairo traffic jam often occur and the typical daily average concentrations of CO thus will exceed the Air Quality Limit values.

Figure 6 indicates the frequency of exceedance of the 8-hour average concentration of 10 mg/m³.

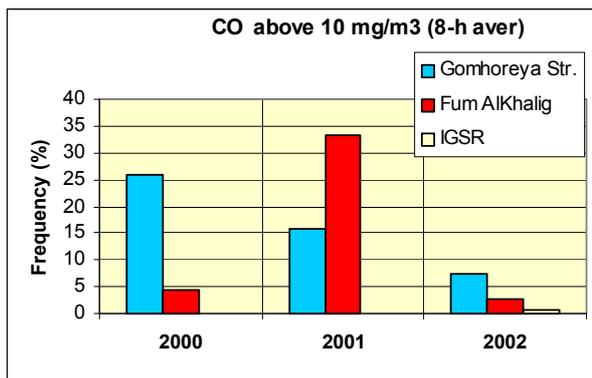


Figure 6: The occurrence of 8-hour average CO concentrations above the AQ limit value of 10 mg/m³ measured at one street canyon and two roadside stations.

In the streets of Cairo, such as around the old opera square (Gomhoreya street) and at the highly traficated FumAlKhalig area the daily 8-hour average CO concentration was exceeded in 5 to 33 % of the time.

Nitrogen dioxide, NO₂

NO₂ is being measured by the EIMP programme at 22 sites in Egypt. Annual average concentrations ranged in 2002 between 25 and 83 µg/m³. In the streets of Cairo the average concentrations were between 75 and 83 µg/m³.

The one-hour average limit value of 400 µg/m³ was not exceeded in 2002. However, the 24-hour average limit value of 150 µg/m³ was exceeded during one to five days in the streets of Cairo. Passive sampling data indicate that there may be other areas with high traffic density where the limit values occasionally were exceeded.

Ozone, O₃

Measurement data indicate that ground level ozone together with small particles is one of the major air pollution problems of Egypt. We therefore have to understand the formation and occurrence of ozone.

Ozone (O₃) at the surface is most often created by a chemical reaction between oxides of nitrogen and volatile organic compounds (VOC) in the presence of heat and sunlight.



Motor vehicle exhaust and industrial emissions, gasoline vapours, and chemical solvents are some of the major sources of NO_x and VOC, which help to form ozone. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air.

In the greater Cairo area the transport time during hot summer days is long enough so that large amounts of harmful ozone is being created in the area. Afternoon maximum concentrations as recorded at Giza (Cairo University) and at a roof station at Abbaseya are typical examples of this kind of regional formation of ozone. Both these sites represent the kilometre scale urban areas away from local sources.

Figure 7 illustrates the annual average diurnal variation of ozone at 4 selected sites in Egypt.

The regional background measurements undertaken at Ras Mohamed at the southern tip of Sinai indicate that the background ozone level is on the average higher than the levels measured in Cairo and Alexandria.

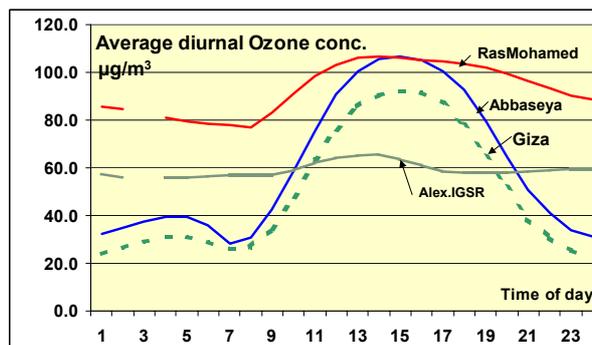


Figure 7: Annual average diurnal variation of ozone measured at 4 sites in Egypt 2000-2002.

In Alexandria we see from Figure 7 that the ozone levels are influenced by NO_x emissions from traffic in the city. The “fresh” NO_x emissions are “using” ozone. The concentrations are therefore relatively low as the site clearly is located inside the urban boundary layer.

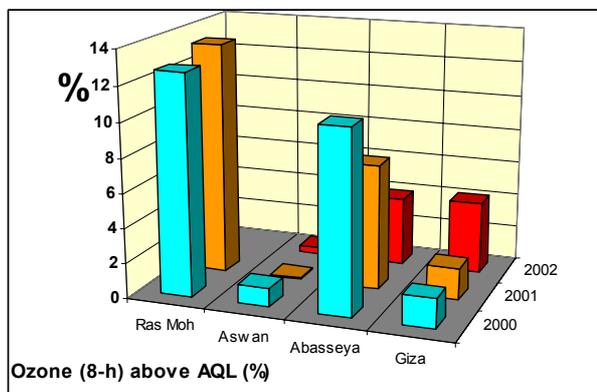


Figure 8: The frequency (%) of 8-hour average ozone concentrations exceeding the AQL of 120 $\mu\text{g}/\text{m}^3$.

The 8-hour average limit value (120 $\mu\text{g}/\text{m}^3$) was exceeded more frequently than the one-hour average limit values, as the relatively high ozone concentrations during the summer season seem to last for several hours.

At Ras Mohamed the 8-hour average concentration was exceeded during 13,4 % of the time in 2001, at Abbaseya 10,5 % of the time in 2000 and at Giza and Aswan up to about 4 % of the time. During the summer season exceedances are found more frequently.

Summary and conclusions

Suspended dust (measured as PM₁₀ and TSP) is the major air pollution problem in Egypt. Annual average concentrations of PM₁₀ range between 100 and 200 $\mu\text{g}/\text{m}^3$ in urban and residential areas and between 200 and 500 $\mu\text{g}/\text{m}^3$ near industrial areas. Daily average concentrations of more than 6 times the Air Quality Limit value for Egypt are being recorded occasionally in the urban areas of Cairo. The natural background concentration of PM₁₀ in Egypt has been evaluated to represent levels close to or around the Air Quality Limit value of 70 $\mu\text{g}/\text{m}^3$ as a daily average.

The concentration levels of SO₂ and NO₂ have also been observed to exceed the Air Quality Limit values in industrial areas and during some occasions in the big cities. Both the long term (annual averages) and the short-term (1-hour average) Air Quality Limit levels have been exceeded. Eight-hour average CO concentrations in streets and along roads in Cairo frequently exceeded the Air Quality Limit value.

High concentrations of surface ozone have been observed as a result of regionally produced secondary pollutants in the Cairo region.

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Appendix D.3: SO₂ Memo



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Memo for Newsletter

Date: 24 March 2004

To: Ahmed Abou Elseoud (AAE),

Copy: Haytham Ahmed (HAA), Ashraf Saleh Ibrahim (ASI)

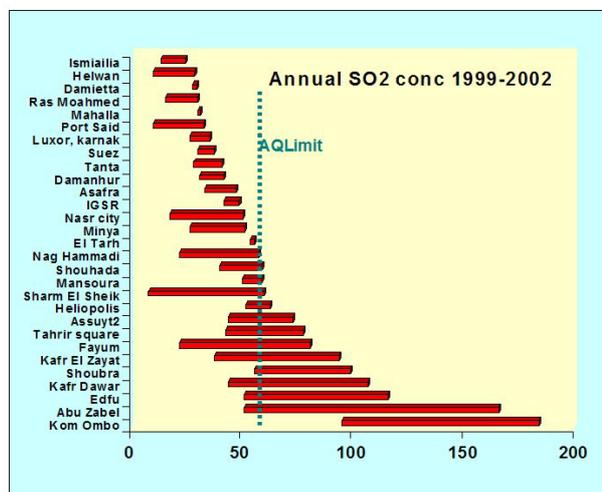
From: Bjarne Sivertsen (BS)

SO₂ concentrations in Egypt

The sulphur dioxide (SO₂) concentrations measured at more than 30 sites in Egypt occasionally exceed the Air Quality Limit values as given by Law no. 4.. The limit values are most often exceeded in or near industrial areas and in some few cases inside urban areas as in the Cairo city centre. A trend analyses does not show significant improvements during the last few years.

The general picture of SO₂ in Egypt

SO₂ concentrations have been measured as integrated concentrations over 2 to 4 weeks at about 30 different sites located all over Egypt.



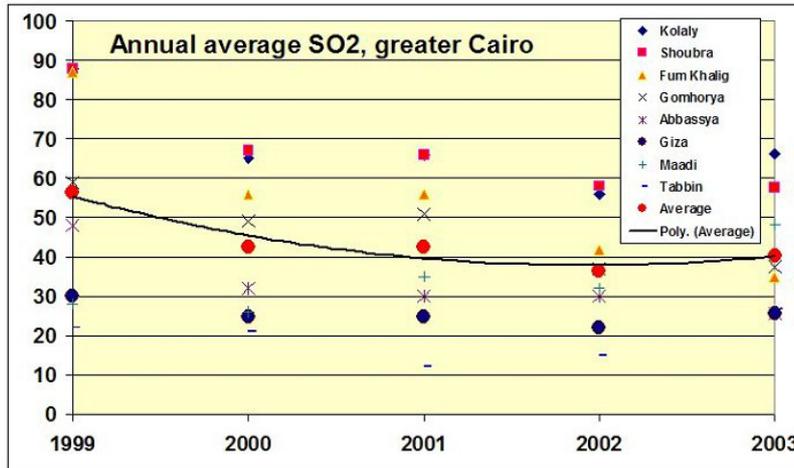
About one third of these sites have experienced SO₂ concentrations that exceeded the air quality limit values. Even if SO₂ is not an air pollution problem of the same magnitude in Egypt as suspended particles, industrial areas like Shoubra ElKheima (several industries), Abu Zabel and Kom Ombo (where the measurements are taken only 1 km downwind from a sugar factory) have revealed

frequent exceeding of the limit values. Industrial areas as Kafr Zayat and the urban

city centres of Kafr Dawar and Edfu have also recorded high SO₂ concentrations. Continuous measurements using automatic monitors have confirmed the data from Tahrir Square showing that SO₂ levels have occasionally exceeded the limit values also in the greater Cairo area..

Is it getting better

An analysis of the SO₂ concentrations measured by automatic monitors in the greater Cairo area during the last 5 years has revealed that the SO₂ concentrations in 1999 were slightly higher than in 2003.

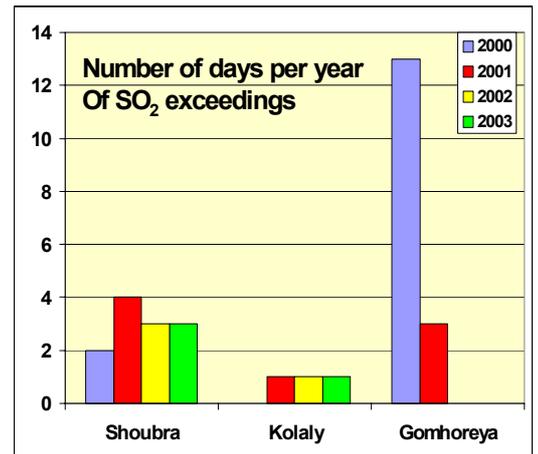


However, from 2001 till 2003 there have been no significant changes in the average long-term concentrations of SO₂ in the greater Cairo area. The city centre station of Kolaly still exceeded the annual average limit value of 60 µg/m³.

Exceeding limit values in Cairo

Analyses of the frequency of exceeding the limit values indicated that both the 1-hour average and the 24-hour average limit values had been exceeded in Cairo. Concentrations higher than limit values occurred most often for the 24-hour average at Shoubra, Kolaly and ElGomhoreya Street. The occurrence of concentrations above the limit values varied from year to year and from site to site, and ranged from less than 1% to 13% of the time. (The highest frequency occurred at Gomhoreya Street in year 2000).

The number of hours and days when limit values are exceeded seem to have been slightly reduced during the last year. In 2003 Shoubra exceeded the limit values on 3 days of the year (1% of the time). At Kolaly only one day exceeded the limit value, while the levels at Gomhoreya street never exceeded the limit value.



Appendix E

National Air Quality Network

Appendix E1: Memo



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Memo

Date: 16 March 2004
To: Ahmed Abou Elseoud (AAE), Danida
Copy: Haytham Ahmed (HAA),
From: Bjarne Sivertsen (BS)

A sustainable air quality monitoring programme for Egypt – at what cost

Introduction

The EIMP air pollution monitoring programme has been a long process of procurement, installations, repeated training of several counterparts and continuous on-the job training at all levels. To continue operating this programme as to day with adequate quality and confidence will require that:

- Experts that have received training stay with the future EEAA air quality monitoring programme
- Instruments, databases and equipment are kept updated and in good quality
- Spare parts and consumables are made available in good time before needed
- Quality assurance programmes are kept at the level originally established.

The normal lifetime of air quality monitors that are being used in the EIMP programme is between 5 and 10 years. This implies that many of the monitors that have been installed since the end of 1997 till 1999 already are reaching the end of their normal lifetime.

In the following discussions we have roughly evaluated the annual cost for operation and maintenance of the air quality monitoring programme for Egypt such as designed during the EIMP development.

We also have to stress that a report is being prepared as the final input from the EIMP Phasing Out Project in which a National Air Pollution Monitoring system for Egypt is presented based on both the EIMP as well as the CAIP programme. In this report we will prioritise the most important sites to give a fair picture of the air quality in Egypt in the future. Some of the areas may have to add dispersion model capabilities to the monitoring to improve the possibility of environmental assessments system in the future.

Experts for field operations

The backbone of obtaining good quality air pollution data is linked to sustainability. As stated in my memo dated October 2000 on “ A sustainable air quality measurement programme for Cairo”, the main challenges are to ensure that the experts will stay with the programme and that fast and flexible procedures are established for obtaining equipment and resources necessary to operate the measurements.

The field operations require that trained monitoring experts are visiting the stations every week. Other experts are responsible for the databases and quality assurance of the programme, while a third set of experts should take care of maintenance, repair and calibrations. The instruments in question contain:

- Automatic gas monitors
- Automatic ambient suspended particle monitors
- Sequential samplers,
- High volume samplers
- Passive samplers
- Automatic Weather stations

All these instruments are being operated by a team of trained experts at CEHM at Cairo University (for Cairo, Canal area and Upper Egypt) and IGSR at Alexandria University (for Alexandria and the Delta region).

Database and data assessment

Databases have been established at the Monitoring Institutions (CEHM and IGSR) and at EEAA. These databases occasionally need upgrading, and updated computers and hardware systems may also be needed. The costs for upgrading has not been implemented from the beginning of the EIMP establishment. However, after 7 years of operations it is clear that both the System Manager database and the EEAA database will need upgrading and maintenance.

To meet the future requirements of fast and on-line access to air quality data and assessments we have indicated that that EEAA should start preparing the tools for performing an air quality management planning system. The tools for such assessment and abatement strategy planning procedures are available.

One such system that meets the requirements of modern air quality assessment is the AirQUIS system, which was developed by the Norwegian Institute for Air Research (NILU) (www.NILU.no) to handle a number of air pollution tasks and challenges. It is based on a Geographical Information System (GIS) and it supports direct data and information transfer, data presentation tools as well as statistical and numerical modelling capabilities for now-casting and forecasting. It also supports Internet based data dissemination tools.

Consumables and spare parts

The operations of the programme will need a number of consumables and spare parts. This will be the case also when the instruments are new and in perfect condition.

Consumables and spare parts are being specified by CEHM as soon as the need has been identified. This includes such as:

- Calibration gases,
- Pumps for monitors and high volume samplers,
- Filters for various purposes,
- Charcoal, O-rings, fuses etc.
- Solutions and chemicals,
- Repair kit and sensors

Consumables and spare parts are ordered locally, from international dealers or from NILU Products. The updated list of consumables and spare parts available at the monitoring institutions has to be presented to EIMP/EEAA as soon as possible after identification of the needs.

As an example we can mention that the gas calibration system, which was introduced in 2002, did not receive the required amount of gas bottles and regulators to adequately operate the system. The missing parts have been estimated at about 60 000 LE. In the meantime the consumption of gas has been larger than anticipated. It thus proves expensive not to purchase the complete system at once. Also several meteorological sensors have now been broken due to aging and they need renewals.

Instrument lifetime and upgrading

The design, development, construction and installation of the EIMP measurement programme started in 1997 and were completed in July 1999. The Centre of Environmental Hazard Mitigation (CEHM) at Cairo University and the Institute of Graduate Studies and Research (IGSR) at Alexandria University are operating on behalf of EEAA, a total of:

- 14 sites located in Greater Cairo area,
- 8 sites in Alexandria area,
- 7 sites in Delta,
- 3 sites in Canal area and sites in Upper Egypt and Sinai

The total programme include more than one hundred instruments in field at any time, consisting of:

- 46 automatic monitors for SO₂, NO_x, PM₁₀, O₃, and CO,
- 26 AirMetrics and Hivol PM₁₀ samplers
- 14 sequential samplers for SO₂ and NO₂
- 5 High volume samplers for TSP
- 18 dust fall collectors
- 8 Automatic Weather stations
- A number of passive samplers (flexible)

From the last meetings with the Monitoring Institutions we have seen that some of these instruments are meeting their lifetime expectancies. More expensive parts will have to be changed and some instruments need major repairs.

To keep up the quality in the monitoring system, as well as assure sustainability we will have to propose that instruments are gradually replaced with new instruments. The procedures in other countries demand that instruments are taken off field when expensive parts indicate that the lifetime of the instrument has been reached.

The instrument is then collected for storage in the laboratory for 5 years, while a new instrument is being installed in field.

It may be possible to modify and upgrade the programme and to reduce the measurement programme by adding dispersion models to the measurement data. This will in the future give an even better total picture of the air quality situation. We will return to these options in the proposed future National Air Quality Monitoring and Assessment Programme (NAQMAP) for Egypt.

Below we have presented a rough estimate for the annual costs related to the existing measurement programme without any modifications, improvements or changes.

Annual costs roughly estimated

Based on the above discussions as well as the experience gained from the present operations of the EIMP programme, we have roughly estimated the costs for continued operations of the EIMP programme.

Annual cost for EIMP operations

Item	Basis	Estimated cost (1000 LE)
Manpower, field operations	As present	750
Reporting	As present	50
Spareparts & Consumables	All 100 instruments	300
Renew monitors	15% annual turnover	900
Renew samplers	10 % annual change	60
Renew AWS	1 new per year	95
Shelters, lines infrastruct		50
Total annual cost		2205

A rough estimate indicate thus that the annual cost for the future operations of the EIMP programme will be about 2,2 million Egyptian pound.

Appendix F

Training

Appendix F1: Memo



EIMP

Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt

Seminar, Cairo 21 March 2004

Air Quality of Egypt Data and Interpretations

The seminar will update the participants on the air quality monitoring programme for Egypt established as part of the Danida EIMP programme developed for EEAA.

The seminar will present the measurement programme, some of the major results and discuss and the background data as well as assess some of the results. We will also look into the future air quality monitoring objectives and briefly present the basis for air quality assessment and planning.

Seminar programme

Time	Topic
10:00	Welcome and introduction
10:15	The measurement programme as presented to an international forum
11:00	- Discussion-
11:15	Data and interpretation
12:15	- Coffee break
12:35	A closer look at the air quality; levels, trends, exceeding limit values Is the air quality being better?
13:30	A sustainable programme for the future – at what cost
14:00	Air Quality assessment and planning, how can the EIMP data be used for planning in the future?
14:30	Discussions, questions and summary
15:00	End

Appendix F2: Seminar



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI

30 Misr-Helwan Str. Maadi, Cairo, Egypt

Seminar, Cairo 21 March 2004

Air Quality of Egypt Data and Interpretations

Name	Institution
1- Dr. Mousa Allam	CEHM
2- Eng. Ahmed Fathy	CEHM
3- Dr. Essam A. Morsy	CEHM
4- Dr. Tarek M. El-Araby	CEHM
5- Eng. Yassin Fathy	CEHM
6- Hala Ali Hamdalla	EEAA- Suez
7- Chem. Marwa Nasr	EEAA
8- Chem. Mohamed Gamal EL-Dein	EEAA-Tanta
9- Hossam Ahmed Said	EEAA
10- Sabry Abd EL-mohsen	EEAA
11- Chem. Mohmoud M, Mohamed	EEAA- Hurgada
12- Chem. Ahmed Hassan El-Bagoury	EEAA- Mansoura
13- Chem. Ekhllass G. El-Din	EEAA
14- Ramdan Hassan Eid	EEAA-Assyut
15- Nabil M, Abd El-Mosen	EEAA-Aswan
16- Chem. Hany M. Nabil	EEAA
17- Chem. Sayed M. Abd Rabbu	EEAA
18- Mohammad E. Sayour	EEAA
19- Sherien Fakry	EEAA
20- Dr. El-Sayed Shalaby	IGSR
21- Dr. Mohamed El-Raey	IGSR
22- Eng. Ahmed Abou El-Seoud	EEAA/EIMP
23- Chem. Ashraf Saleh Ibrahim	EEAA/EIMP
24- Chem. Haytham A. Ahmed	EEAA/EIMP
25- Abd El-Hafiz Ali	EEAA-Greater Cairo
26- Zekry Fahmy Ghatass	IGSR

List of participants

Appendix F3: Slides presented at the Seminar 21 March 2004

Air Quality of Egypt

Data and interpretations

Bjarne Sivertsen
NILU
Coordinator for Air Quality

Edward A. Blumenthal
Norton, Andrew
Richard Stone (London)

Support: International
White Agency (IWA)

EAA
Egypt Environmental Affairs Agency
Environmental Information
and Monitoring Programme

EIMP
Co-ordination
supported by **DANIDA**

Responsible for Air Quality

EIMP AQ monitoring objectives

- Provide general description of AQ
- Enable comparison of AQ in different areas
- Estimate individual source contributions
- Indicate exposure to people
- Evaluate levels compared to standards
- Add to future info and assessment of AQ

Air Pollution in Egypt

- Background and objectives
- Sites and indicators
- Limit values
- The problem is dust
- SO₂, NO₂ and CO
- An Air Pollution Episode
- Tropospheric ozone

A closer analyses

Selection of sites covering all Egypt

Number of sites selected in different types of areas

Type	Ca	Al	D+C	UE	Sm	Total
Industrial	4	3	3	3		13
Street/Road	2					2
Urban	1	1	2	3		8
Residential	4	3	4	3		16
Background	1	1			1	3
Total	14	8	10	9	1	42

Indicators

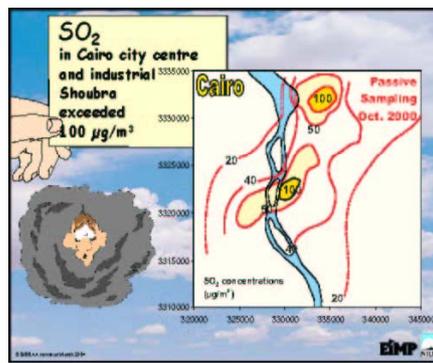
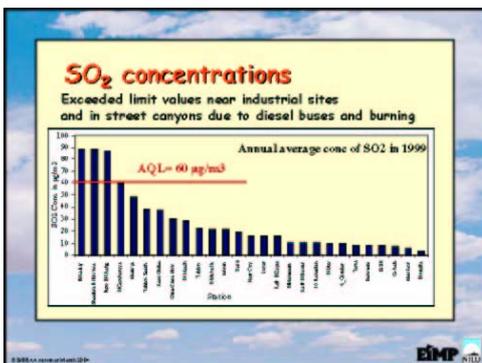
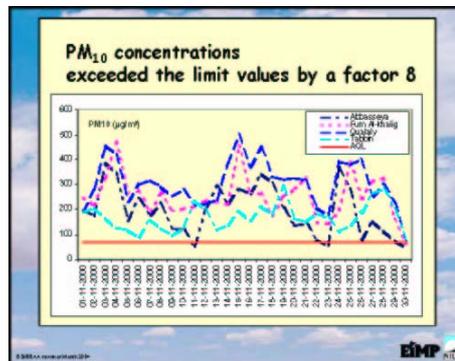
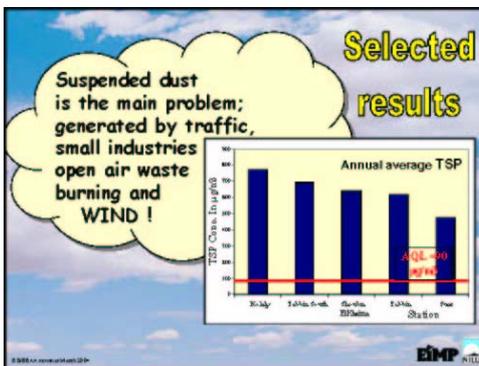
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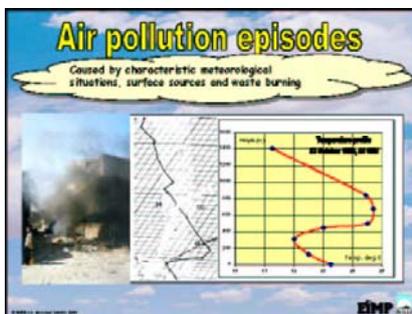
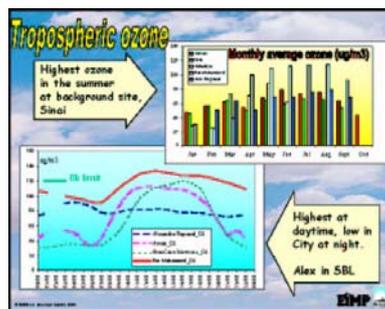
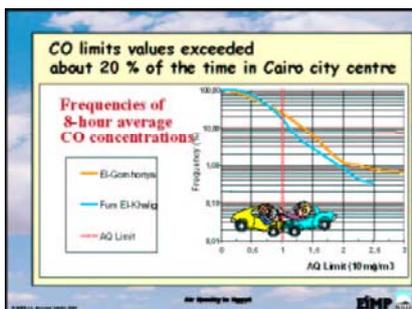
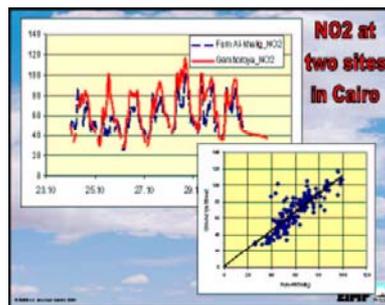
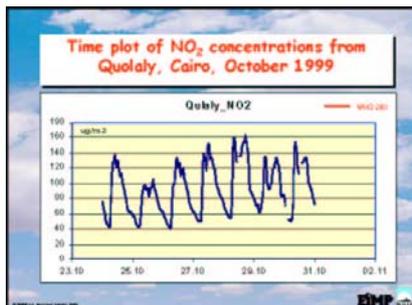
- Give general picture
- Easy to interpret
- Respond to changes
- Provide international comparisons
- Allow trend analyses

- Sulphur dioxide (SO₂)
- Nitrogen dioxide (NO₂)
- Particles D > 10 µm (PM₁₀)
- Ozone (O₃)
- Carbon Monoxide (CO)
- Total suspended matter (TSP)
- Lead (Pb)
- Organic compounds (VOC)
- Dust fall

AQ monitoring network, Egypt

EAA/EIMP Air Quality Measurement Sites in Egypt





Temperature inversions and weak winds

emissions from low sources give high concentrations in Episodes

Air Quality in Egypt

Episode last week of October 1999

Daily averages

Gomboriya street

Manshara El-Dokki

Typical concentration levels and variations

High concentrations of PM10 may be caused by high winds

Sandstorm closes Alexandria and clouds Cairo

A violent dust laden wind accompanied by cold air hit Cairo on 21 March 2000, turning the Egyptian capital into a ghost city and causing low visibility on main roads leading to and out of the city.

Dust in air 18 January 2000

PM10 El-Dokki

PM10 El-Dokki

PM10 El-Dokki

PM10 El-Dokki

Wind speed and direction influence the PM10 conc. at Tabbin

PM10 conc. vs. wind speed at Tabbin

PM10 conc. vs. wind direction at Tabbin

Conclusions

- Fine particles 2-14 times Law no 4 limit values
- Highest levels of particles near roads and in industrial areas (health hazard??)
- SO₂ exceeded AQ limit values in industrial areas and in Cairo
- NO_x exceeded AQ limit values occasionally in streets of Cairo
- 8-hour average CO frequently exceed AQ limit levels
- High ozone observed at background site and regionally in Cairo
- Air pollution episodes observed due to adverse weather conditions

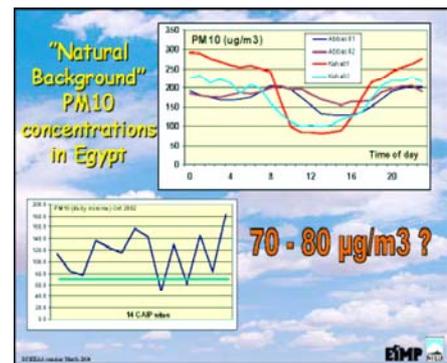
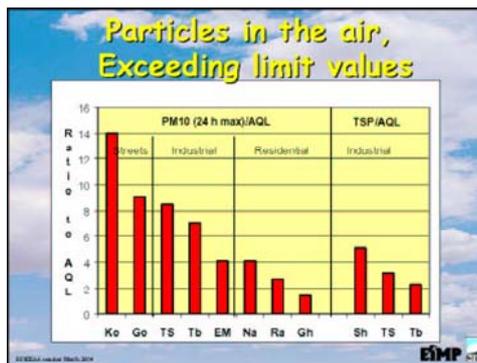
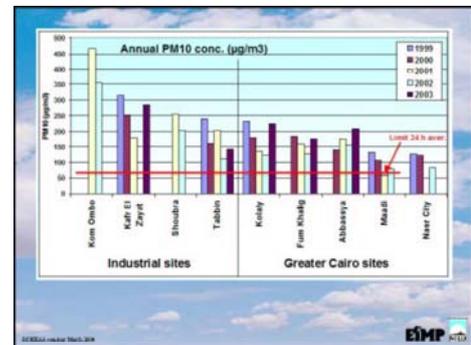
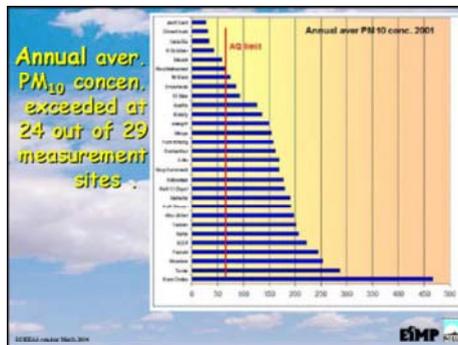
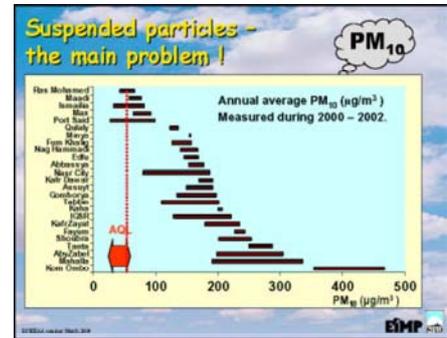
A closer look at results from EIMP

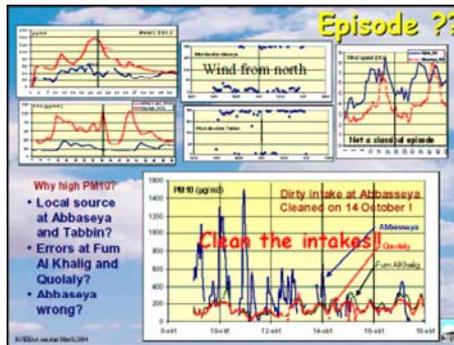
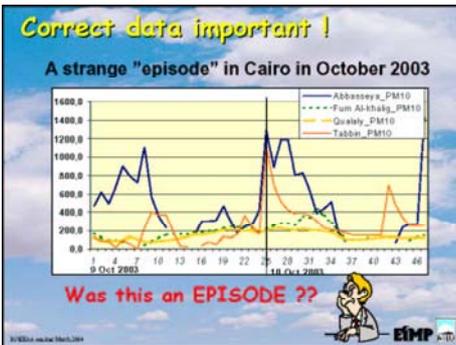
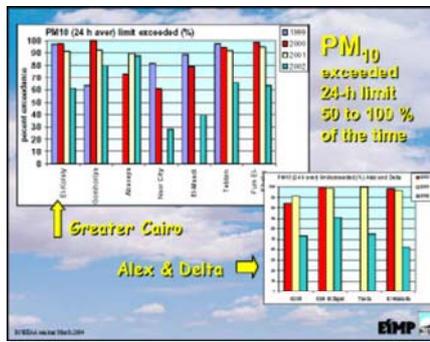
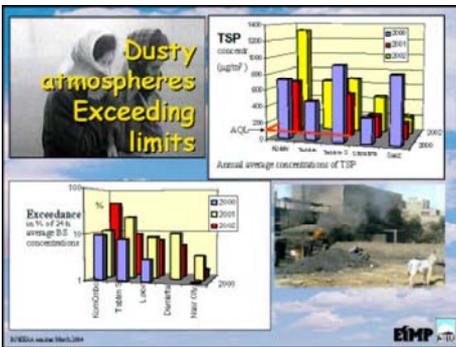
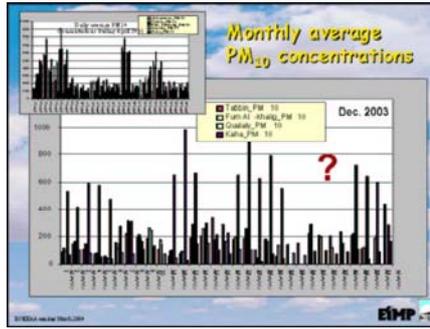
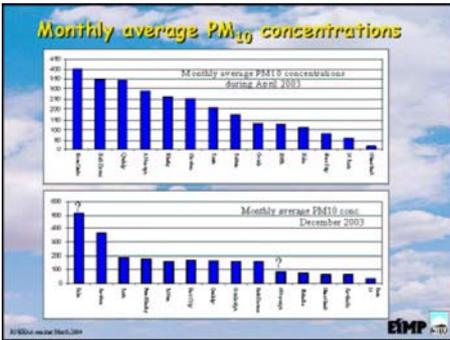


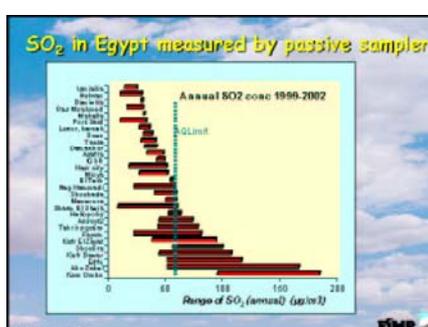
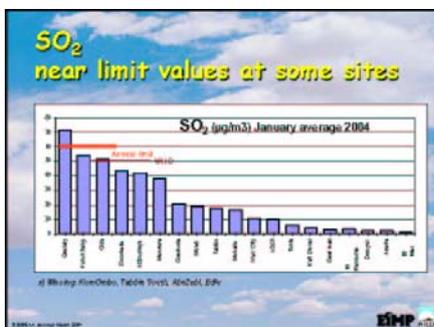
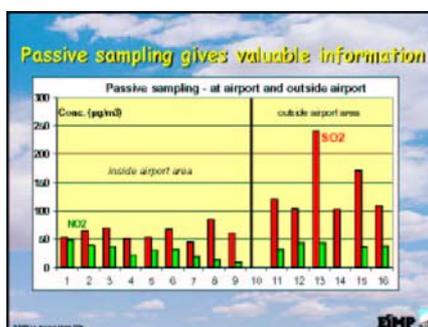
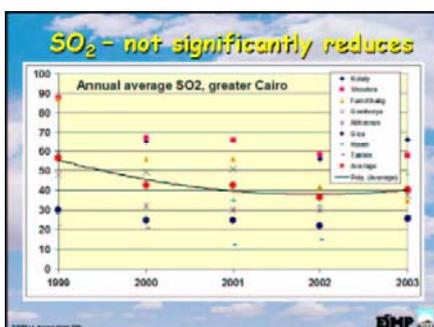
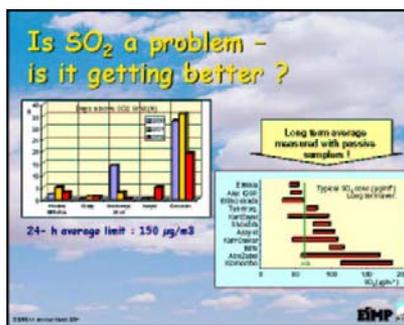
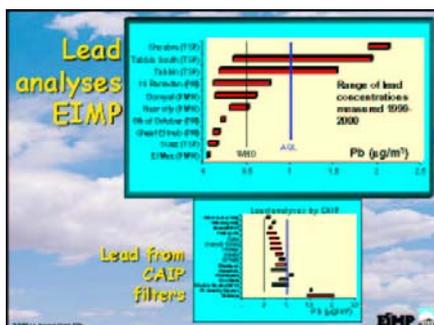
- Particles still a problem
- Correct data important
- Lead levels too high
- SO₂ trend – better?
- CO from traffic (8-h aver!)
- Ozone a regional problem
- Data and examples
- Sources - AQ and meteorology

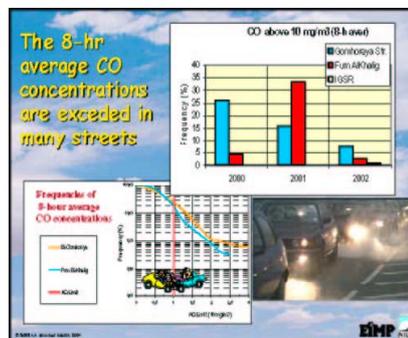
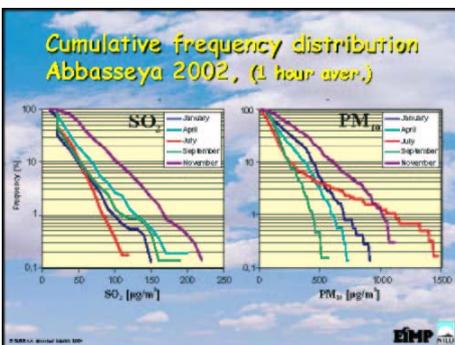
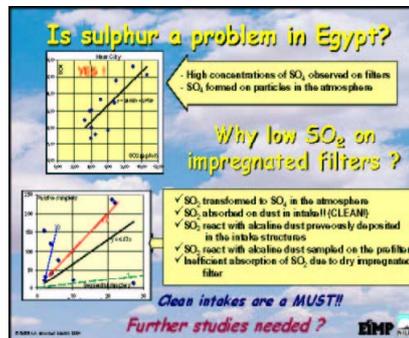
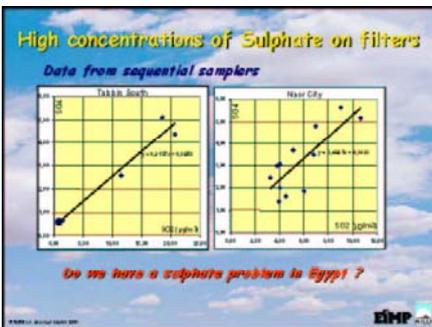
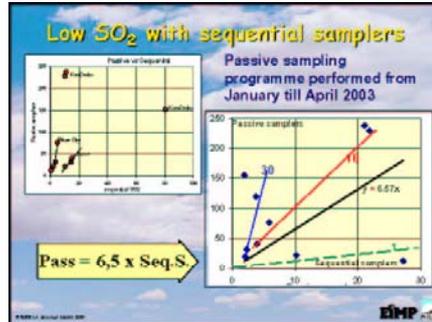
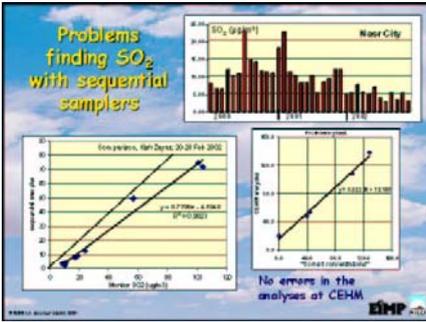
What about the future air quality assessment?

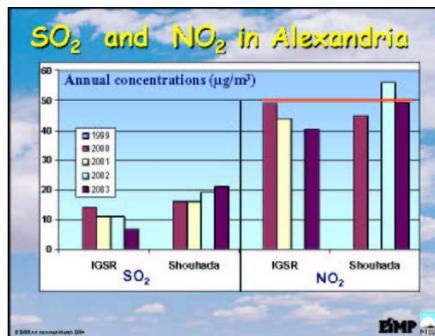
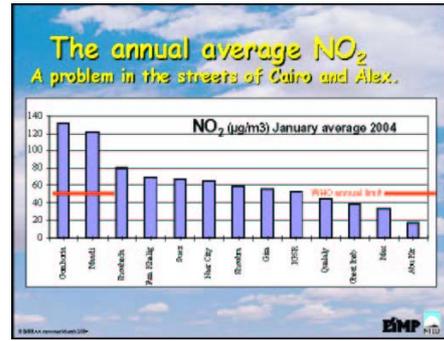
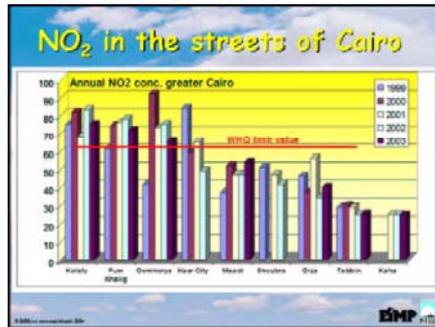
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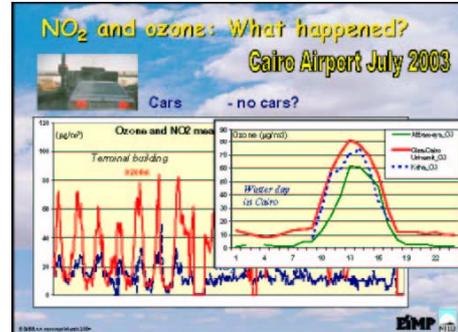
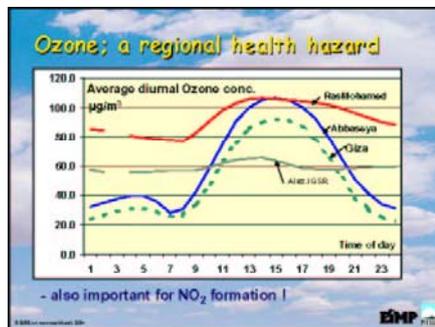


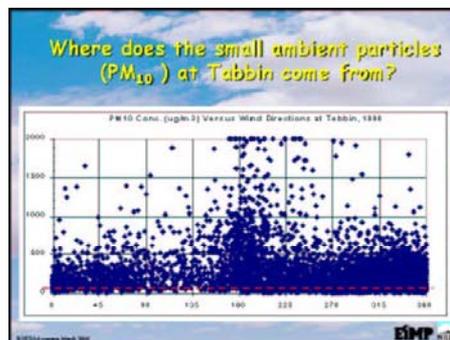
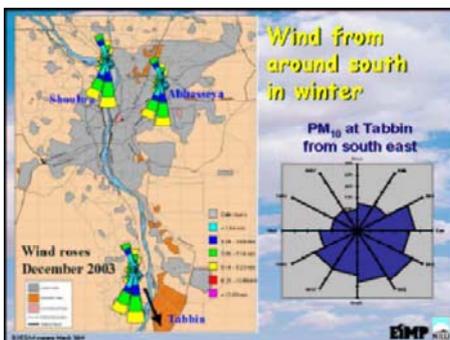
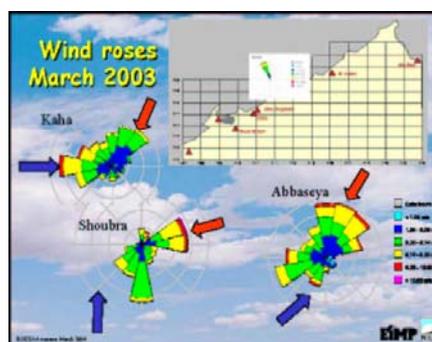
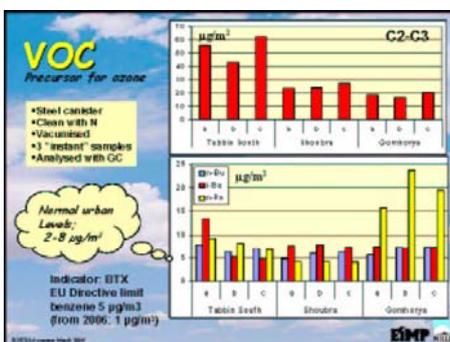
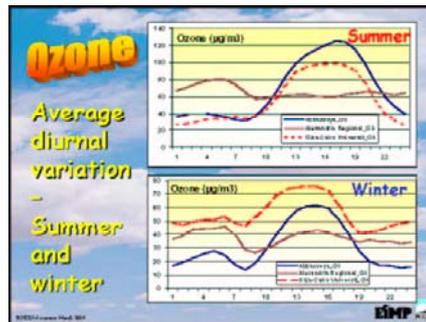


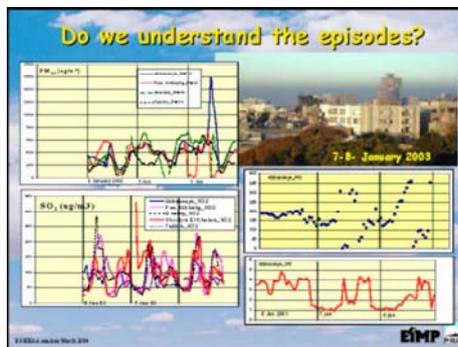
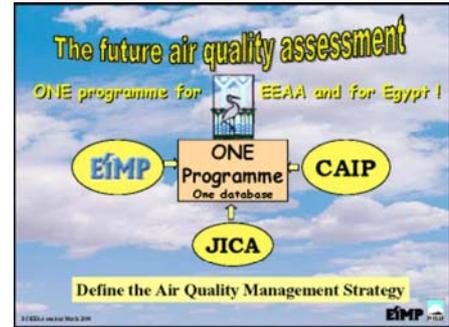
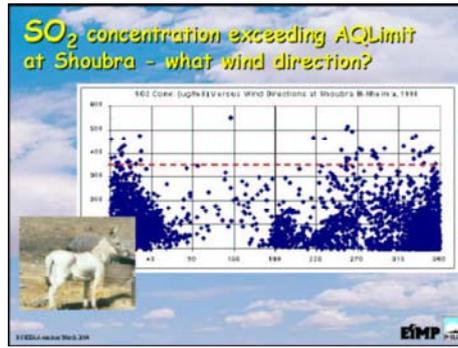


Historical monuments and tourist areas

Site Type	Location	Sampling period	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
Tourist area	Haghadia	14 Apr-9 May	10	13
	Sharm El-Sheikh	3 Apr-4 May	7-19	8-22
	Aswan	16 Apr-15 May	10	17
	Luxor	15 Apr-8 May	13	21
Monument	Minghara	7 May-12 May	64	77
	Chelbi, Aswan	16 Apr-12 May	13	10
	El-Di, Tempel	16 Apr-12 May	6	9
	Conconbo Tempel	16 Apr-12 May	20	1.5
	Luxor, Karnak	15 Apr-12 May	12	13
	Sakhsan pyramid	2 May-12 May	174	20
Qiza pyramid	2 May-12 May	35	30	
Sphinx	7 May-12 May	158	31	







Sustainability

A sustainable air quality monitoring programme in Egypt?

How can we achieve it ?

- Training local experts
- Profound understanding of QA/QC
- Good maintenance of equipment
- A permanent trained staff (sustainable!)
- Sufficient economic support, at all levels!
- A good database and presentation system
- Well defined objectives and application goals

EIMP

A Sustainable AQ Programme at what cost?

42 sites and > 100 instruments

48 automatic monitors for SO₂, NO_x, PM₁₀, O₃, and CO.
 25 AutoMetrics and fixed PM₁₀ samplers
 14 sequential samplers for SO₂ and NO_x
 5 High volume samplers for TSP
 18 dust fall collectors
 8 Automatic Weather stations
 A number of passive samplers (flexible)

Annual cost for EIMP operations

Item	Quantity	Estimated cost (1000 LE)
Personnel	14 present	700
Equipment	14 present	60
Maintenance & Consumables	14.8 present	200
Vehicle transport	100 % annual change	60
Online samplers	10 % annual change	60
Online AQS	1 online per site	60
Online AQS	1 online per site	60
Online AQS	1 online per site	60
Total annual cost		2000

Annual: 2,2 mill EL ?

EIMP

Future national air quality monitoring programme for Egypt

No.	ISO Code	Formula	Name of pollutant	Units of measurement	Average over
1	01	SO ₂	Sulphur dioxide	µg/m ³	1h
2	03	NO ₂	Nitrogen dioxide	µg/m ³	1h
3	24	PM10	Suspended particulates (< 10 µm)	µg/m ³	24 h
4	39	PM2.5	Suspended particulates (< 2.5 µm)	µg/m ³	24 h
5	8.a.10	PM1	Suspended particulates (< 1 µm)	µg/m ³	24 h
6	22	SPM	Suspended particulates (total)	µg/m ³	24 h
7	19	Pb	Lead	µg/m ³	24 h
8	08	O ₃	Ozone	µg/m ³	1h
9	124	CO	Carbon monoxide	µg/m ³	24 h
10	04	CO ₂	Carbon dioxide	µg/m ³	1h

EIMP

ONE monitoring System for Egypt

Will require:

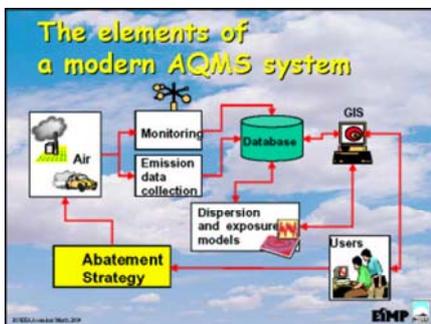
- ✓ Site evaluations
- ✓ Source identification
- ✓ Priority discussion
- ✓ Design
- ✓ Installations
- ✓ Applications

Air Quality Assessment ?

Does Egypt need a modern Air Quality Management System?

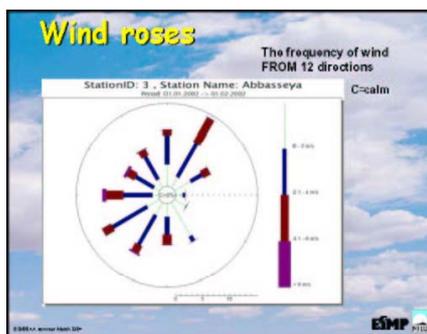
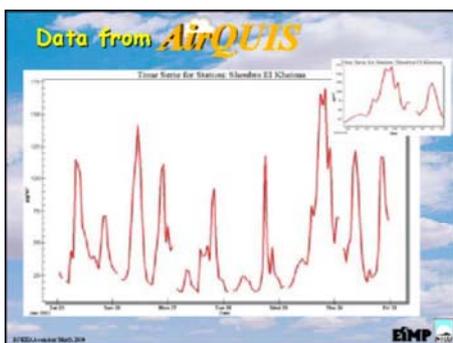
AQMS objectives:

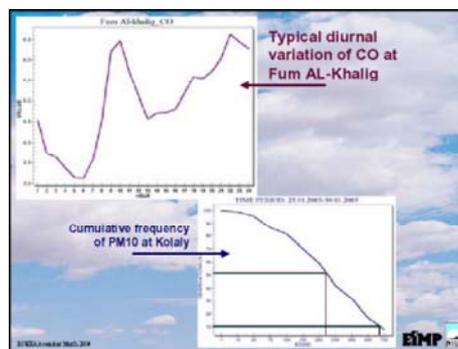
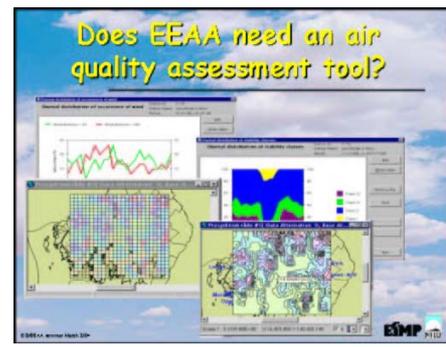
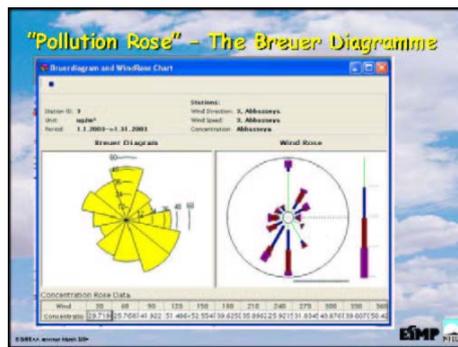
- To enable on-line air quality data presentation → Internet
- To provide complete air pollution exposure information
- To enable development of cost-effective air pollution abatement strategies



AirQUIS Applications

- Environment impact assessment
- A.Q. forecasting and early warning
- Optimal abatement strategies
- A.Q. information systems, incl.
 - Online data
 - Internet applications





Appendix G

Administration Work

Appendix G1: Memo



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Memo

Date: 18 October 2003
To: EIMP, Ahmed Abu ElSeoud (AAE)
Copy: Ashraf
From: Bjarne Sivertsen (BS)

Proposed new air quality limit values

Introduction

Revisions of the Egypt's Air Quality Standards and Limit Values as stated in Law number 4 of 1994 have been discussed several times during the EIMP programme. In the discussions of high PM₁₀ concentrations frequently measured in Egypt, the natural background levels originating from wind generated dusts in the desert areas was evaluated in a Memo dated 31 May 2003 (Mission report 02, NILU OR 41/2003, Appendix F2).

It has also been stated (Sivertsen et.al. 2001) that the background level seems to be around the daily minimum levels measured; 70 µg/m³, which is equivalent to the present Air Quality Limit values given by the Law no. 4 of Egypt. These levels can be found also in areas where local anthropogenic sources do not impact the measurements.

In October 2003 Chemonics International under a USAID contract proposed a revision of maximum limits of outdoor air pollutants. A draft document was released on 14 October 2003. This memo briefly summarises some of these proposals.

TSP and Black Smoke

Measurements of Total Suspended Particles (TSP) and Black Smoke (BS), has been carried out as part of the EIMP programme to enable discussions of these compounds relative to the existing air quality limit values for Egypt. We also consider BS as a fair indicator for combustion particles, which may be carrier of health hazardous substances such as PAHs and other toxic compounds.

The Chemonics report recommends that the measurements of TSP and BS should be phased out, and the monitoring stations upgraded to measure PM₁₀ as the main measurements of particulate pollution.

Suspended particulate matter

The PM₁₀ and PM_{2,5} concentrations in air are known to be injurious to health through inhalation. Air quality standards given both by the European Union (EU Daughter Directives) and by US EPA are concentrating on PM₁₀ and PM_{2,5} measurements.

In line with international recommendations it is proposed that three new maximum limits be introduced in the revision of Egyptian standards:

- Annual average PM₁₀,
- 24-hour average PM_{2,5}, and
- Annual average PM_{2,5} (for Cairo)

Setting the standard for PM₁₀ considering the relatively high “background levels” it would be counterproductive if the law were seen to be unrealistic and impossible in its expectation for compliance. It was therefore recommended that the annual average maximum level for PM₁₀ should be 70 µg/m³ expressed as the median value.

Gaseous pollutants

No change is recommended for current maximum limit values. However, the criteria for 8-hour average CO and ozone concentrations should be explicit. Moving averages and 99-percentile for a specific year is specified.

Lead

Lead limits are recommended to follow the WHO guideline value as well as the EU Directive’s level of 0,5 µg/m³ .

New Limit Values

A summary of the new proposed air quality limit values for Egypt as proposed by the Chemonic Criteria Document is presented in the following table.

Compound	Limit value ($\mu\text{g}/\text{m}^3$)	Average	Exceeding, comments	Impact
SO ₂	350	1 hour	Not to be exceeded more than 175 times per calendar year	Health
	150	24- hour	Not to be exceeded more than 3 times per calendar year	Health
	60	year		Ecosystem
	500	hourly	Alert threshold measured over 3 hrs	
NO ₂	400	1 hour	Not to be exceeded more than 18 times per calendar year	Health
	150	24 hours	Not to be exceeded more than 3 times per calendar year	Health
	400	hourly	Alert threshold measured over 3 hrs	
PM ₁₀	150	24 hour	Not to be exceeded more than 35 times per calendar year	Health
	70	Calendar year	Median value	Health
PM _{2,5}	65	24 hour	Not to be exceeded more than 7 times per calendar year	Health
	15	Calendar year	Indicative annual average value	Health
Ozone	200	1 hour	Not to be exceeded more than 7 times per calendar year	Health
	120	8-hours	8-h moving average, Not to be exceeded more than 4 days per calendars year	Health
	65	24 hour	Arithmetic mean	Ecosystem
	360	1 hour	Alert threshold	
Lead	0,5	Calendar year	Arithmetic mean of 24 h average measurements	Health
	1,5	Quarter year	Arithmetic mean of 24 h average measurements every 3 month	Health
CO	30	1 hour	Not to be exceeded more than 24 times per calendar year	Health
	10	8.hour	8-h moving average, Not to be exceeded more than 3 times per calendar year	Health

Appendix G2: Minutes from meeting



Environmental Information
and Monitoring Programme
Phasing out Phase
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467

Minute from Meeting

Date: 23 March 2004

Place: ESP office, EEAA building, Maadi,

Participants: Anders Bjørnehave (Danida), Mounir W Labib (ESP National Coordinator), Ulla Lund (EIMP, Ref Lab task manager), Bjarne Sivertsen (Air Quality task manager).

Distribution: Morten Andersen COWI, Ulla Lund

From: Bjarne Sivertsen (BS)

Meeting with Environmental Sector Programme Support (ESP)

Introduction

A short meeting was called by Anders Bjørnehave at the ESP to discuss the status of the components present in Cairo at the moment. He also wanted to get some input about the status of the complete EIMP Phase out project. These matters were discussed with COWI, and a feedback from Karin Rothman Hansen and Anders Randsløv stated that Morten Andersen would be back from holydays next week. He would then contact Mr Bjørnehave as soon as possible and give the total status

We were limited to give information about the status of the components represented by Ulla Lund and Bjarne Sivertsen.

Status

Both Ulla and Bjarne concluded that the components RefLab and Air Quality was on schedule, and was following the project descriptions in details. Several memos had been handed over to Mr Bjørnehave concerning the Air Quality Component. These memos are also sent to Morten Andersen at COWI.

The memo concerning keeping the Air Quality monitoring programme for Egypt sustainable was discussed. The rough cost estimate for sustaining the present Air Quality programme was originally requested from Ahmed Abou ElSeoud, and indicate that the annual cost for keeping the EIMP programme as is will be about 2,2 million EL. The responsibility for keeping this sustainable is with EEAA.

It was also stressed that a report on a complete unified national air quality monitoring programme for Egypt, merging EIMP, CAIP and other measurements into ONE programme on ONE database is underway. This report is being produced based on the tasks and objectives described in the project documents.

Analysing the time schedule for the different components of the EIMP Phase Out Programme issued by COWI on 13 February 2004, it seems as all component are on schedule. There are about 6 man months of work remaining as of 23 March, and the project will be terminated at the end of the year.

The air component met an unforeseen problem. After one week of fieldwork Rolf Dreiem had a heart attack and had to return to Norway. His work will be taken up later during the year and terminated in October as scheduled.

Component constraints

Mr Bjørnehave specifically addressed what possible constraints there were in keeping up the anticipated measurements during the EIMP Phase out period. Two items were presented where additional financial support may be needed form ESSP.

Calibration regulators

The funds made available for equipment for improving and changing the calibration system in the Air Quality programme was originally estimated at 375 000 DKK. This amount of money were used to purchase gases and equipment. However, it turned out that, when Rolf supported the installations, all the parts needed to have a quality assured calibration were not available (see memo dated 22 March 2004). The remaining equipment have been estimated at about 60 000 EL.

Accreditation of NIS Air Quality Reference laboratory

The reference laboratories at Ain Shams (together with the CCC at EEAA) have received funds from USAID for receiving accreditation. The NIS air quality reference laboratory has not been included. Ulla therefore requested between 80 000 and 100000 EL to achieve accreditation at this NIS laboratory. Accreditation is needed to provide surveillance of the Reference Laboratories after the end of EIMP.

EEAA have the responsibility

Mr. Anders Bjørnehave pointed out at the end of the meeting that there is NO money available for this project from Danida anymore. The responsibility for keeping up the programme in the future will totally be at EEAA. It is therefore important that the EIMP Phase Out project coordinator manage to convince the EEAA top administration that this is the “bottom line”. Mr Bjørnehave also pointed out that all requests for additional funds be channelled through the main contractor.

Appendix G3: Memo



**Environmental Information
and Monitoring Programme
Phasing out Phase**

**EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 525 6467**

Memo

Date: 24 March 2004

To: Ahmed Abou Elseoud (AAE),

Copy: Haytham Ahmed (HAA), Ashraf Saleh Ibrahim (ASI)

From: Bjarne Sivertsen (BS)

Reminder at end of Mission 04 from BS

The following list is a summary of items identified during Mission 04 from B Sivertsen concerning the EIMP Phase Out Air Quality Monitoring Programme.

1. The spare part still available in the storage should be transferred to CEHM! At least an updated list of spare parts and the status of these has to be produced. (See memo about responsibility and trust.)
2. Some shelters need repair (CEHM and IGSR will identify needs and do it!). The problem is money. Can they prepare a cost estimate and have the money for repair? (HAA)
3. Some calibration gases are being emptied. Ask for a complete overview from the monitoring institutions and prepare further purchase in the near future.
4. Working standard regulators specified in memo of 22 March should be ordered as soon as possible. There seem to be no money from Danida ESP for this. (Check with Dr Mounir)
5. Follow-up the problem concerning passive sampling results versus sequential samplers performance. Ask CEHM to measure SO₂ in bubblers located behind the filters. Rolf was prepared to support this study.
6. Prepare moving shelter and instruments from AlAsafra to new site south of Alexandria. Ask ElSayed Shallaby to perform the re-installation.)
7. Move the site in Sues!! The new site has been selected, get allowances and MOVE!! Soon!
8. VOC sampling programme has to be followed up. Continue sampling at ElShouhada, ElMax, Damietta and ElGomhoreya street.
9. Follow up the installations of measurements in Beni Suef. Discuss possible changes in the programme, including new site studies during next Mission. (AAE, BS)
10. Follow up met sensor upgrading! New sensors are needed for IGSR and ELMansoura.



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An institute in the Environmental Research Alliance of Norway

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		NILU PROJECT NO. O-96013	
AUTHOR(S) Bjarne Sivertsen and Rolf Dreiem		CLASSIFICATION * A	
		CONTRACT REF.	
REPORT PREPARED FOR: COWI/EIMP EEAA Building, 30 Misr Helwan Street Maadi, Cairo, Egypt			
<p>ABSTRACT</p> <p>The EIMP Phasing-out Phase has been formulated to consolidate EIMP achievements, while gradually integrating the EIMP activities and staff into the existing EEAA administrative and organisational structure. The third Mission during the EIMP Phasing out Phase Air Quality component was undertaken during 4 October to 29 October 2003. Bjarne Sivertsen and Rolf Dreiem participated in the Mission. Continued training in reporting and air quality assessment were important parts of the Mission. New sites were visited to update and improve the national monitoring programme.</p> <p>Site visits were also undertaken to check the quality of measurements, maintenance and repair. The quality assurance programme was modified to start calibrating using travelling standards at the stations. Several meetings were held during the Mission, and various type of support was given to EEAA to upgrade and improve the air quality monitoring network.</p>			
<p>NORWEGIAN TITLE</p> <p>Overvåkingsprogram for luftkvalitet i Egypt</p>			
KEYWORDS			
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ABSTRACT (in Norwegian)			

* Classification

A Unclassified (can be ordered from NILU)

B Restricted distribution

C Classified (not to be distributed)

