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Environmental Information and Monitoring Programme (EIMP). Air Quality Monitoring Component

Mission 12 Report

Bjarne Sivertsen, Leif Marsteen and Rolf Dreiem

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1 Introduction

The twelfth mission to Egypt was undertaken in February - May 1999.

The EIMP project is funded by Danida and headed by COWI.

The total project includes four components:

- Coastal Water monitoring (responsible VKI (Danish Water Quality Institute) and COWI)
- Air pollution monitoring (responsible NILU),
- Reference laboratory (responsible VKI) and
- Pollution sources and emissions (responsible COWI).

The work undertaken during the winter and spring of 1999 included the preparations, establishment and start up of monitors, on-the-job training, training in chemical analyses, data evaluation and reporting. A comprehensive amount of time was spent with the Monitoring Institutions to undertake training in data evaluation, data statistics and reporting.

Further site studies were undertaken, as the component again, for the third time, had a change in counterpart. The new counterpart, Mr. Haytham Ahmed, has no experience in the field of air pollution, and training and education was implemented every day during each operation.

An intensified installation programme was designed, and instrument check, calibration and preparation were performed prior to installation and training. On-the-job training continued as part of the installation programme.

The Air Quality Monitoring Team consisted of B Sivertsen, Haytham Ahmed, and Rolf Dreiem. Leif Marsteen updated the SOP procedures in February, and undertook further training including the first auditing for the Reference Laboratory at NIS. Oddvar Royset, who was responsible for chemical analyses of samples, visited the laboratories in February-March and finalised the training in inorganic analyses.

The following tasks are being undertaken, referring to the work programme activities:

A. Institutional support
   Define databases and undertake training of counterpart and Monitoring Laboratories.
B. Design of monitoring programme
   Introduce the new counterpart to all sites, and finalise site studies in the Delta and in Upper Egypt.
C. Procurement
   Specifications for additional equipment needed and discussion of the use of PM_{10} / $PM_{2,5}$ AIRmetrics samplers.
D. Data management
   Discuss data availability, data quality and specify databases locally and at EEAA.
E. Training
   Perform on-the-job training at the Monitoring Laboratories including data interpretation, reporting, installations, calibrations, operation and chemical analyses.
F. QA/QC
   Continue implementation of the QA/QC procedures at all levels. Specify instrument calibration procedures and upgrade standard operational procedures. Undertake training for Reference Laboratory on auditing.
G. Monitoring
   Continue to install monitoring programme and start data retrieval. Install new stations. Begin maintenance programme. Finalise installations in Cairo and Alexandria. Install sites in Delta. Evaluate data, develop reports at Monitoring Laboratories and at EEAA.
H. Reference Laboratory
   Calibrate monitors and samplers, start to re-calibrate after one year in field, take the responsibility for standard gases. Receive training in auditing, and start the audit programme.
I. Component Co-ordination
   Prepare reports, memos, monthly status reports, meetings etc. Prepare a status of the air quality in Egypt after one year of measurements, to be presented in Seminar on 13 May 1999.

The responsible personnel at the various institutions involved, as well as some of the persons we met during mission 11 are presented in Appendix A. The visit by O Royset has been presented in a separate report (Mission 10 report).

2 A. Institutional support

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

The staff at CEHM that have been selected for air quality monitoring station operations is presented in Appendix A3.

Samples of organic air pollution (HC and VOC) will be started in October 1999. A new expert is needed for developing and up-grading the organic part of the laboratory at the Monitoring Laboratory in Cairo. This expert will undertake all necessary training in the preparation of samples, collection of samples and analyses of these air pollution samples

A brief presentation of this expert is included in Appendix A4.

3 B. Design of monitoring programme

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

Most of the sites for the total air pollution monitoring programme for Egypt have been selected in earlier visits. However, due to the change of counterpart, several of the sites in the Delta and in Upper Egypt had to be revisited.

Some of the sites already selected were also changed. In Middle and Upper Egypt some of the sites were visited several times, due to difficulties in reaching an agreement with local authorities. (See Appendix B2.1).

The discussions concerning the use of CAIP AIRmetrics samplers for extending the EIMP/EEAA air pollution measurement programme lead to the presentation of possible sampling sites for PM10 measurements presented in Appendix B.2.2.

3.2 Activity B.2.2 Define site characteristics

At the end of Mission 12 site characteristics have been defined for all sites. The sites selected represent different area types, bearing in mind that the EIMP programme is mainly designed to monitor the impact in areas where people live. The different EIMP air quality monitoring sites have been characterised as follows:

- Industrial areas (represented by 12 sites),
- Urban city centres (8 sites),
- Streets and road sides (2 sites),
- Residential areas (15 sites),
- Regional and background areas (3 sites).

A total of 14 sites are located in the greater Cairo area, 6 sites in Alexandria, 10 sites in the Delta and Canal area, 9 sites in upper Egypt and 1 site in Sinai.

For the new monitoring sites the surrounding area, local sources and possible impacts has been described in Appendix B. Some of the site descriptions also include local maps, co-ordinate specifications and photos where available.

3.3 Activity B.2.8 Establish agreements with monitoring site owners

A major reason for some delays and changes in the installation schedules has been due to problems in obtaining adequate agreements from site owners, such as Governerates and Educational Authorities in the various areas. Agreements with the site owners about the use of their sites have been prepared. A general letter was developed to present the monitoring programme and to seek approval for using the location. The letter also described the location of the instruments.

In addition permission had to be given for installation of electricity and for telephone lines where necessary. The telephone line procedures take much more time than anticipated, and the end of Mission 12 only 4 sites had lines in fully operation.

4 C. Procurement of equipment, hardware and software

4.1 Activity C.2.1 Procure instruments and equipment

Various equipment needed for the laboratory at CEHM was identified during the visits in October 1998 and March 1999. A list of proposed purchases with descriptions of laboratory equipment is presented in Appendix C.2.1.a.

The delivery times for supply of spare parts and consumables was investigated. A list of suppliers, addresses and delivery times was prepared and presented in Appendix C.2.1.b

A new System Manager for IGSR in Alexandria was ordered in November 1998. (Appendix C.2.1.c). The delivery has, however, been delayed due to various reasons. A discussion with Kontram concerning backup diskettes further delayed the delivery. Finally a direct communication to the American producer at EMC speeded up the process. However, at the end of Mission 12, the System Manager had not yet been delivered.

Kontram also was very late in responding to the ordering of standard gases and permeation tubes (Appendix C.2.1.d). At the end direct contact was made to another supplier of gases.

4.2 Activity C.2.2 Prepare instruments for installation

Monitors and samplers were released from the storage in Maadi and calibrated at the Reference Laboratory at NIS prior to the installation in the field.

Shelters were constructed in a work shop located north of Maadi and inspected at the work shop prior to transport to the sites.

5 D. Data management

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

Data collection procedures have been specified for data collected by passive samplers, sequential samplers and for automatic monitors. Procedures for use of high-volume samplers for TSP and PM_{10} have also been specified and established at the monitoring institutions.

The data retrieval and data storage at the Monitoring Laboratory is based upon the use of the System Manager. Data scaling, data storage, data quality control etc. has been discussed as part of the training of the Monitoring Laboratory personnel. Training of expert personnel for this operation at the data retrieval computer was based upon System Manager specifications. However, a preliminary database including a simple graphical and statistical tool was developed based upon Excel. The Monitoring Laboratory experts have been trained in the use of this tool for preparing the quarterly reports.

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

Data quality controls apply both to the automatic monitoring data and to semi automatic and manually collected data. The technical tools have been supported by quality control descriptions, manuals and reporting procedures. Logbooks are established for each instrument. The laboratory routine data monitoring, retrieval, storage and quality control begins as soon as the instruments are installed.

5.3 Activity D.1.5 Telecommunication lines

Telephone lines have been made available at Giza, Cairo University, IGSR, Tebbin, El-Gomhoriya, Quolaly and Shoubra el Kheima. The goal is to equip all monitoring sites with telephone lines to enable the daily quality control on the stations.

5.4 Activity D.2.1 Prepare database for manually analysed data

A laboratory database for manually collected samples was prepared during Mission 10. This database is used to store and convert for chemical analyses data into air pollution concentrations. Preliminary data will be entered into this database for manual check and control before the data are transferred to the Monitoring Laboratory database for statistical treatment and presentation. (See Mission Report 10 and Appendix D.2.1)

The use of the local database for manually analysed data was checked and verified during Mission 11; 21 February to 4 March 1999. (Mission 11 Report)

5.5 Activity D.2.2 Local database for monitor data at the Monitoring Laboratories

The System Manager represents the local database for monitoring data. The system manager (as a local database) will contain all one-hour average data; concentrations of gases and particles as well as all meteorological data. These data will be quality assured and controlled in the final version of the local database. The data will represent the basis for the development of quarterly reports and aggregated data transferred to the EEAA database.

The System Manager for IGSR was ordered at the end of 1998, but had not arrived at the end of Mission 12. Training for a proper use of this database will have to be undertaken as soon as this database has been installed at IGSR.

5.6 Activity D.3.1 EEAA data base

The database for air quality data is being developed by use of local consultants under the supervision of EIMP expatriate and Egyptian staff. This work started at the beginning of 1999. EIMP staff will prepare specifications for the database, which will include all air quality data, i.e. automatically registered monitoring data as well as manually generated data from samplers.

The development lifecycle and a first specification of the database is presented in Appendix D. The database will be structured to handle hourly, 8 hour and 24 hour average values for monitoring data. It will be developed by use of standard software applications thus facilitating easy import/export of data and compatibility to standard GIS software.

6 E. Training

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

The most important part of the training activities relates to the generation of data, QA/QC, calibration, maintenance, and repair of monitors and samplers (sequential air-samplers and high-volume samplers). The measurement teams at the Monitoring Institutions have received this kind of training continuously since the end of 1997. An example of training activities undertaken during Mission 12 is presented in Appendix E.

To present the complete QA/QC procedures given in the SOP and manuals a seminar was held in Cairo on 3 December 1998. A seminar report has been made available (Marsteen and Lund, 1998). Marsteen also repeated some of this training during Mission 12.

6.2 Activity E.2.3 On-the-job training at the Monitoring Laboratories

Assessment of training needs at the monitoring institutions and the reference laboratory-air is an ongoing activity. Several seminars and workshops have been undertaken since the beginning of the programme. The monitoring institutions as well as the EEAA counterpart have received training in interpreting and understanding the air quality data collected. Basic training in air quality work has been given to the Team leader counterpart, and further training courses have been specified.

Training was given for preparation of filters and analyses of various filters for sequential samplers, passive samplers and high-volume samplers. More details are given in Mission Report 10.

6.3 Activity E.2.4 Support training to Reference Laboratory personnel

The following training has been given to the Reference Laboratory-air staff:

- QA for monitors, including validation and control routines

- Complete training in external calibration, including documentation

Flow calibration

- Auditing of monitoring stations/field check of calibration

- Completion of Reference Laboratory quality system documentation as regards technical issues

Training in wet chemistry methods for analysis of manually collected filter samples was also offered to the Reference Laboratory personnel, but only one person attended only one session.

A training workshop was given on 15-17 March 1999 (Marsteen and Lund, 1999). The workshop was intended to introduce the Reference Laboratory personnel to Audit programmes. Audit basics and theory was presented during the first day. On the second day the air quality site at Tabbin was audited. Also a summary meeting between the Reference Laboratory personnel and the Monitoring institution was arranged to summarise the experience.

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

The main part of the System Manager training included practical use of the system. The operational experts should undertake remote calibrations, data quality controls, cleaning of data, data plots and storage of raw data. The main training has been undertaken as on-the-job training during applications.

Further training in the use of the System Manager is needed and will be undertaken after installation of the second System Manager at IGSR.

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

The EEAA ambient air pollution database will include statistical programmes designed for air quality and meteorological data and will act as a report generator. Basic training in the use and understanding of some of this statistics was briefly started during Mission 12. Some basic education was given during the development of annual reports and during the interpretation and discussion of air quality data collected.

6.6 Activity E.6.1 Sample preparations

A final training programme for the preparation and use of various filters for sequential samplers and for passive samplers was undertaken in February 1999. The work performed at CEHM chemical laboratory is described in Mission Report 11.

6.7 Activity E.6.2 Chemical analyses of various filters

Some training in the evaluation of results of the SO_2 and NO_2 samples was performed during Mission 11 and 12. Problems in understanding some of the very high concentrations of SO_2 and NO_2 and some consistently low levels recorded in Alexandria were discussed during Mission 12.

All procedures were repeated without finding solutions to the problem. Additional filters were collected and brought back to NILU for analyses. These results will be available at the end of 1999.

7 F. QA/QC

7.1 Activity F.2.1 Instrument calibration procedures

Instrument calibration procedures, SOPs and logbooks have been developed. Quality control procedures at field and laboratory level were finalised during the spring 1999 (see summary table Appendix F). The procedures have been tested and seem to be working satisfactorily.

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

A major part of the QA/QC procedures were developed during the first half of 1998. The reference material for the quality system documentation was finalised in June 1999. Reports from seminars and workshops have been made available and all SOPs and documentation material are available at the Monitoring Institutions. All monitoring and sampling sites should be equipped with logbooks and the necessary material to adequately operate the stations.

A control of the QA/QC procedures was developed as part of the Audit Programme, to be undertaken by the Reference Laboratory.

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

The Monitoring Laboratory personnel is now operating monitors and samplers using all the SOPs and manuals developed throughout the development of the programme. On-the-job training in the use of these routines has been an ongoing process through the installation| until the completion in June 1999.

7.4 Activity F.4.1 Input from Reference Laboratory- Air

The air quality monitoring staff has, in collaboration with the Reference Laboratory sub-component staff, develop procedures for undertaking audits at the Monitoring Institutions. The first actual audits were undertaken at two sites in March 1999. The auditing programme has been developed and is considered operational at the end of June 1999. (Appendix F.4.1)

8 G. Monitoring

8.1 Activity G.2.3 Monitoring programme updated

The monitoring programme needs a continuous evaluation and updating. Some items have already been specified for further improvements, such as the monitoring station at Gomhoryia Street. The monitors will be built into a smaller room, which will be air-conditioned.

Preparation of stands and masts as well as improvements of shelters is part of the improvement of the measurement infrastructure. (See contract agreement Appendix G.3.1)

Work notes were developed from day to day during the installation period. Examples are given in Appendix G.2.3.b. All work notes from R Dreiem during the installation period February-July 1999 is presented in Mission report 13.

Possible sampling sites for AIRmetrics instruments for PM_{10} and $PM_{2,5}$ sampling has been discussed, as shown in Appendix B.2.2.

8.2 Activity G.3.2 Install monitors

The installation schedule that was planned for completion by mid-1999 has almost been followed and completed in spite of practical problems concerning site owners, permissions, infrastructure details etc. The work plan for the spring 1999 is shown in Appendix G.3.2.

At the end of June 1999 only 3 sites remains to be installed and/or modified. Measurements are being undertaken at a total of 37 sampling and monitoring sites all over Egypt. In addition passive sampling is being performed at about 20 more sites.

	Cairo	
1	Cairo city El Qualaly	Urban centre
2	El Gemhoroya street	Street canyon
3	Meteorological Inst	Urban / Res.
4	Nasr City	Residential
5	Maadi EEAA building	Residential
6	Tabbin	Industrial
7	Tabbin south	Industrial

8	Fum Al-Khalig	Road side/urban
9	Abu Zabel	Industry/res
10	Shoubra el Kheima.	Industrial
11	Giza, Cairo University.	Residential
12	Gizapyramid	Regional
13	6 October	Res/industrial
14	10 Ramadan	Res/industrial
	Canal area	
15	Suez	Iindustrial/res.
16	Port Said	Residential
17	Ismailia	Residential
	Upper Egypt	
18	El Fayum	Urban
19	El Minya	Res./ Industrial
22	Naga Hammadi	Iindustrial/res
23	Luxor	Urban/residential
24	Edfu	Industry/urban.
25	Kom Ombo	Industrial
26	Aswan	urban/residential.
	Sinai Area	
27	Sharm ElSheik	Background
	Alexandria	
28	Abu Keir College	Industrial
29	El-Max Petrogas	Industrial
30	IGSR Alex University.	Urban/road side
31	El-AzafraUniversity.	Residential
32	Gheat El-Inab school	Residential
33	Alexandria, regional	Regional

	Delta Area	
34	Damanhur	Industrial/residential
35	Kafr el Zayet	Industrial/residential
36	Tanta	Urban
37	ElMahalla El Kubra	Industrial/residential.
38	El Mansura	Industrial/res.
39	Domyat	Residential

	Remaining sites (as of 30 June 1999)	
20	Assyut 1	Industrial/ res.
21	Assyut 2	Residential/urban
40	Kafr Dawar	Urban/industr

All parameters and indicators are still not being operated as some of the instruments are still waiting for installation. Most of these are samplers that will be used intermittently. Also sampling of organic compounds will be started during the fall 1999.

An updated complete air quality sampling and monitoring programme is presented in Appendix G.3.2.b. Various memos concerning the installations are also included in Appendix G3.2.

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

Maintenance and calibration is needed at all monitoring sites in the programme. Weekly visits are being paid to all sites from the Monitoring Institutions. The instrument experts will evaluate the need for repair and service based upon information collected during these weekly visits to the

stations. Also daily quality controls undertaken by the monitoring institutions will establish a basis for evaluating the need for maintenance and calibration.

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

A maintenance and visit schedule will have to be developed by the monitoring institutions, including support from institutions outside CEHM and IGSR, where this is necessary.

Procedures for instrument and site maintenance was developed and discussed with the monitoring institutions in February 1999 (Appendix G.4.1.a and b). The importance of good maintenance was stressed through follow up and training through the whole installation phase. One example of correspondence with IGSR is shown in Appendix G.4.1.c.

8.4 Activity G.4.2 Service and repair

The field station operators and instrument experts have been trained to evaluate the need for repair and service on a routine basis. Preventive maintenance and repair is stated as part of the contractual agreement with the Monitoring Institutions. Repairs will be undertaken either by the Monitoring Institutions themselves or by the local agent for the particular piece of equipment. In exceptional cases it is envisaged that equipment may have to be shipped abroad for repair.

A survey of spare parts needed for service and repair of monitors, samplers and meteorological equipment has been presented (Appendix G.4.2.)

8.5 Activity G.5.1 Data retrieval and data evaluation

For data collected continuously with monitors the System Manager is used daily for control of calibration factors and span checkpoints, errors, peak values, false data and other peculiarities in the retrieved data. Errors in the data will have to be corrected. The procedures are still being prepared through training and learning.

The first time plots of the data were produced on a routine basis from March 1999 at CEHM. These data were used to verify data quality and to perform further corrections of errors. Daily control routines will also be developed for IGSR in Alexandria, when they receive the System Manager.

Manually collected sampling data are imported to the local database, and printed in graphical form to enable the evaluation of data quality. Graphs from different stations and of different parameters are compared. An example of NO_2 concentrations measured at Nasr City is presented in Appendix G.5.1.

Evaluation of the data requires some training and experience in judging air quality, sources and meteorology. This work started during Mission 12, and will continue during the Consolidations Phase of the project.

8.6 Activity G.5.2 Data presentation

After the air quality data have been evaluated, and the QA/QC procedures have been completed graphical plots of the data will be produced. The data will be transferred to the local database as soon as the first corrections and approvals are available.

These data will be the input to monthly reports. Further evaluation of the data will be undertaken during the preparation of quarterly reports. (see Activity G.7.1). The description of the technical background, data availability, data quality and the data itself will be part of these reports.

Air quality data have been presented in various forms and for various purposes during Mission 12. A Newsletter briefly presented the Air Quality Monitoing Programme, as shown in Appendix G.5.2.a. Another Memo was produced for the Chairman of EEAA in April 1999 to present the measurements in Alexandria (Appendix G.5.2.b).

The first monthly data report was produced based on preliminary data from the Monitoring Institutions. (See Appendix G.7.1.)

8.7 Activity G.6.3 Passive sampling

The passive sampling programme was designed during Mission 12. (See Appendix G.6.3). Passive sampling became a routine part of the EIMP programme during the spring 1999. Measurements of SO_2 and NO_2 using passive samplers have still not been undertaken at all sites.

Results from the passive sampling programme have been reported in the Quarterly Reports as well as in the Summary report on Air Quality in Egypt (NILU OR 33/99).

8.8 Activity G.7.1 Monthly and Quarterly reports

A first monthly report was produced for March 1999 based on preliminary data from CEHM and IGSR. (Appendix G.7.1). SO_2 concentrations from 14 sites and NO_2 concentrations from 12 sites were reported. Also PM10 levels from 7 sites and TSP from 6 sites were included. The main problem in March was suspended particles in the air, which is normal for the air quality in Egypt. Only at one site was the SO_2 air quality limit value as given by Law no. 4 exceeded.

Quarterly reports were produced by the Monitoring Institutions. Both the paper bound reports and the hourly data have also been filed in electronic form on CD discs. Training and discussions of the data quality and data interpretations

have been an important part of the preparation of these quarterly reports. The interpretation and understanding of relationships between sources, meteorology and air quality will have to be followed up during the Consolidation Phase of the project.

The reports available at the end of Mission 12 can be found in the list of References.

9 H. Reference Laboratory

9.1 Activity H.3.1 Training

Training of the personnel at the Reference Laboratory Air at NIS (National Institute for Standardisation) was continued during Mission 12. As part of the training in calibration of monitors several instruments were actually prepared for field operations. A list of such preparations is shown in Appendix H.2.1.a.

9.2 Activity H.3.1 Check field monitors

The responsibilities of the Reference Laboratory Air were verified during Mission 12. An overview of standard gases used at the Monitoring Institutions and at the Reference Laboratory was established (Appendix 3.1) The number of calibration gases, working standards and travelling standards needed to undertake calibrations and controls is shown in Appendix H.

9.3 Activity H. 3.2 Audit programme

The Reference Laboratory also participated in workshops and seminars concerning QA/QC. The start up and training in performing air quality audits to the first sites (Tabbin and Maadi) was undertaken in March 1999. A part of the QA/QC programme also include proficiency tests. These tests started in 1999 with water samples. Also lead on filters will be included as shown in the proficiency test programme Appendix H.3.2.

10 I. Component Co-ordination

10.1 Activity I.2.1 Follow up and administration

This activity is ongoing and includes internal EIMP/EEAA co-ordination as well as external co-ordination with relevant institutions (Egyptian Meteorological Authority etc.) and other donor programmes (e.g. CAIP). This activity also includes organisation of meetings/seminars for briefing of EIMP-external EEAA staff on the activities and results of the sub-component. Other tasks under this heading are preparation of background information for EIMP project management use and follow up on work plans and installation schedules

A number of meetings are held during Mission 12 to Egypt. Weekly staff meetings and weekly air quality project meetings are reported, and represent a major input to the operation of the programme. Examples of minutes from these meeting are presented in Appendix I.2.1.a-b.

Several memos concerning operation of the project, instruments, programme design and personnel has been produced. Also monthly status reports are being presented every month. Examples of such memos are presented in Appendix I.2.1.c-d.

A seminar was prepared and held at Sofitel hotel on 13 May 1999 to summarise the air quality in Egypt after the first year of measurements. The seminar programme and a list of persons invited are presented in Appendix I.2.1.e. The seminar was a success and included presentations from CAIP and JICA as well as a discussion on sustainability. The EIMP presentation can be found in a separate report; Air Pollution in Egypt. Status after the first year of EEAA/EIMP measurements. (NILU OR 33/99).

The EIMP/EEAA air quality monitoring programme was also presented at a International Conference on Environmental Management, Health and Sustainable Development in Alexandria on 22-25 March 1999. The written material is found in report NILU F 7/99. The presentation was more related to the EIMP programme.

A list of reports available from the EIMP air pollution monitoring component is presented in Chapter 11, References.

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Appendix A

People and colleagues - Job descriptions

A.1 People and colleagues

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A.3 Station operators at CEHM

A.4 New expert for organic chemistry

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B.2.1 Site reports
B.2.2 Possible sampling sites for AIRmetrics samplers

B.2.1 Site reports

B.2.2 Possible sampling sites for AIRmetrics samplers

The EIMP air quality measurement programme

Appendix C

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C.2.1 Additional procurement

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b) Delkiveries of spare parts and consumables

c) Quotation for new System Manager

d) Standard gases, permeation tubes etc.

C.2.1 a) Chemical equipment

C.2.1 b) Deliveries of spare parts and consumables

C.2.1 c) Quotation for new system manager

C.2.1 d) Standard gases, permeation tubes etc.

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F.3.1 a) Additional training
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F.2.3 QC documentation Spring 1999

F.3.1 a) Additional training

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F.4.1 Audit plan

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b) Worknotes from Marsteen and Dreiem
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G.5.1 NO_2 concentrations (24 h aver.) measured at Nasr City
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G.6.3 EIMP passive sampling programme
G.7.1 Monthly Report, March 1999

G.2.3 a) Contract for preparation of sites

G.2.3 b) Worknotes from Marsteen and Dreiem

G.3.2 a)Work plan Feb.-June 1999

G.3.2 b)The air quality monitoring programme

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G.4.1 Instrument and site maintenance

G.4.2 Spareparts needed for service and repair

G.5.1 NO_2 concentrations (24 h aver.) measured at Nasr City

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G.6.3 EIMP passive sampling programme

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Appendix H

Reference laboratory

H.2.1 Preparation of instruments
H.3.1 a) Standard gases
b) Distribution of travelling standards
H.3.2 Proficiency tests 1999

H.2.1 Preparation of instruments

H.3.1 a) Standard gases

H.3.1 b) Distribution of travelling standards

H.3.2 Proficiency tests 1999

Appendix I

Co-ordination and meetings

I.2.1

a) Air Quality staff meeting
b) EIMP staff meeting
c) Memo on various matters
d) Status reports (monthly)
e) Seminar programme and invited persons

I.2.1 a) Air Quality staff meeting

I.2.1 b) EIMP staff meeting

I.2.1 c) Memo on various matters

I.2.1 d) Status reports (monthly)

I.2.1 e) Seminar programme and invited persons

Norwegian Institute for Air Research (NILU)

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COWI/EIMP
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Maadi, Cairo, Egypt

ABSTRACT

The twelfth mission to Egypt on the DANIDA EIMP programme included installations, training and reporting. The installation of monitors was finalised. A total of 37 air quality monitoring sites were operated in Egypt at the end of the mission. Monthly and Quarterly air quality data reports were produced and presented. The development of annual reports was undertaken as part of the training in understanding air pollution. Training in QA/QC operations was given to the Monitoring Laboratories. The first Audits to the monitoring stations was performed as part of training given to the Reference Laboratory. A seminar summarising the first year of measurements was given on 13 May 1999.

NORWEGIAN TITLE

Overvåkingsprogram for luftkvalitet i Egypt

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