NILU: OR 46/97

NILU : OR 46/97
REFERENCE : O-96013
DATE : JULY 1997
ISBN : 82-425-0905-0

DANIDA

Air Quality Monitoring Programme

Mission 6 Report

EIMP Environmental Information and Monitoring Programme

NILU Norwegian Institute for Air Research

NILU : OR 46/97
REFERENCE : O-96013
DATE : JULY 1997
ISBN : 82-425-0905-0

DANIDA; Air Quality Monitoring Programme

Mission 6 Report

Leif Marsteen

Norwegian Institute for Air Research
P.O. Box 100
N-2007 Kjeller, Norway

EIMP Environmental Information and Monitoring Programme
3 Abdel Aziz Seim Street
Mohandessine, Cairo, Egypt

Table of Contents

1 Introduction

The sixth mission to Egypt was undertaken in May - June 1997 to start installing monitoring equipment at the Reference Laboratory, Monitoring Laboratory, Tabbin Institute station and Shoubra El-Kheima station and to start planning the QA/QC documentation. The work was based upon the plans for the second phase of the Environmental Information and Monitoring Programme (EIMP) for the Arab Republic of Egypt, for which NILU is responsible for the development of an air pollution monitoring system.

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

The visit in May - June 1997 included some siting studies and visits to Tabbin Institute (station and storage room), University of Cairo (Monitoring Laboratory facilities) and CTS (looking at Cairo University's monitors). The visit also initiated the work on the QA/QC documentation. The visit was originally scheduled from March to July but was delayed because the instruments did not arrive in Egypt until June. The objectives of this visit included the following tasks referring to the work programme activities:

C.2.2. Prepare instruments for installation
F.2.1. Specify instrument calibration procedures
G.2.3. Start monitoring programme and data retrieval
H.1.1. Installation of monitors at Reference Laboratory
H.1.2. Calibration of monitors initiated

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

2 Site visits

Bjarne Sivertsen together with Dr. Nasar and Leif Marsteen visited El Minya 25 May. Dr Nasar visited Tabbin south 18 May. Leif Marsteen and Dr. Nasar visited Shoubra El Kheima and Abu Sabel 19 May.

The siting reports are presented in Appendix B except for the El Minya report which is presented in the Mission 5 Report.

3 Cairo University as Monitoring Laboratory

The contract for the Monitoring Laboratory is still not signed.

3.1 Visit to Cairo University

A visit was paid to Cairo University, Environmental Hazard Mitigation Centre (EHMC) to look at the Monitoring Laboratory facilities. We met with Dr. Tarek Mohamed El Arabi (Vice director of information and data analyses).

A room of approx. 15 m^2 was made available for the laboratory. This is too small for the operation of the Monitoring Laboratory or the Reference Laboratory. There will be too few benches and the free floor space will only be approx. 10 m^2. The requested total size is 36 m^2 for the Reference Laboratory and 20 m^2 for the Monitoring Laboratory. In addition both labs should have a storage room of approx. 10 m^2. A smaller room was made available as office for EIMP.

Considering the small space it will be impossible to start preparing instruments without a storage room. The unpacking of instruments produces a lot of boxes which must be stored somewhere. The boxes will later be used every time the instruments are transported, e.g. to the site or to the Monitoring Laboratory.

If a storage room is made available the preparing of instruments can start, but we will run out of space as soon as we start installing High volume samplers which need to be operated on the floor or when instruments are returned from the sites for repair, maintenance or calibration.

Dr. Tarek Mohamed El Arabi wanted to install the data acquisition computer in their computer room. The physical accessibility to the computers should be limited by installing them in another room, e.g. the small office made available to the project.

3.2 Air quality monitoring station

EHMC is planning to install a complete air quality monitoring station at the University dormitory. Monitors for SO_2, NO_x, ozone, and meteorology have already arrived. The delivery also contains a multigas calibration unit. The instruments are still stored at Chemical and Technical Services (CTS) in Cairo.

We visited the site. The room was good. It only needed to be cleaned and painted. A bench must be installed along the wall opposite to the door. An air condition is also needed. The meteorological station had been selected to be located on the lawn approx. 70 m away from the room. The distance appeared to be too long for transmitting the signals to the data logger. Later the University decided to put the meteorological station on the roof of the dormitory but only to use a 3 m mast. The signal cables will be short enough but the mast is too short for making correct measurements. Following a discussion with meteorologists at NILU the mast should be at least 5 m.

The University wants to refurbish the room using tiles on the floor and walls. It will cost approx. Le 10,000. The work is still not finished.

4 Alexandria University as supplementary Monitoring Laboratory

The University of Alexandria wants a greater responsibility for the stations in Alexandria and the delta. They want to operate a Monitoring Laboratory on an equal basis to the one planned for the University of Cairo. It means a duplication of all Monitoring Laboratory functions, personnel and facilities. The project will have to assist two institutions instead of one. It will be a major increase in workload for the Air quality experts. The stations in Alexandria and the delta are too close to Cairo (2 - 3 hours by car) to justify a second Monitoring Laboratory in Alexandria. The stations can be maintained from Cairo.

5 Visit to Chemical and Technical Services

ElSueini of Chemical and Techincal Services (CTS) invited Leif Marsteen and Mohammed Nassar to visit CTS in Garden City. We were shown the monitors of the University of Cairo which still were not installed at their station. The instruments are similar to the instruments of the EIMP project. During three days (22 - 24 June) Aly Hamed of CTS demonstrated the O_3 monitor, SO_2 monitor, NO_x monitor and the multigas calibrator. We were allowed to operate the instruments and to inspect them in detail. The instruments and the operation of them looked good.

CTS seems to believe that we will install one multigas calibrator at each site. Our plan was that there will be only one multigas calibrator installed and it will be installed at the Reference Laboratory. Presently (July 1997) it seems that we have to install one calibrator in Cairo and one in Alexandria.

6 Shelters

We visited the station at Tabbin Institute. The station is situated in a room at the top of a building. The room has windows which can be opened. As a rule a station should not have windows and the door should close tight to prevent outdoor conditions such as dust, sunshine and temperature from affecting the instruments. In addition to heat from the outdoor the instruments themselves generate a considerable amount of heat. The indoor temperature should be kept well below 40 °C at which the monitors stops operating. The sensitivity of monitors is known to change with temperature. To keep the indoor temperature at a safe and relatively constant level most stations will probably need an air conditioner.

Arab Contractors are willing to support the project with a complete shelter at city centre and prepare a room in their building in El Gemhoroya street.

Dr. ElZarka wants the project to support a mobile station for doing measurements for limited periods of time on short notice. Originally this was meant to be the main content of an industrial oriented air quality project supported by Japan (JICA). We can build a shelter on wheels that can be towed by a car. The shelter can be equipped with measurement equipment and used as an ordinary station when it is not called for. A cost estimate for this modification has not been presented.

7 Instrument deliveries and installation

All air quality instruments and equipment ordered have been divided into 3 deliveries. The first two deliveries, weather stations and particle samplers (first delivery) and half of the monitors (second delivery) have arrived in Cairo, but have not been released from customs.

The late release and the not finalized contracts for Reference Laboratory and Monitoring Laboratory made it impossible to install any of the projects instruments during this visit. We have asked through Kontram that CTS undertake the first four installations. During the installation people from the Reference Laboratory and Monitoring Laboratory will be trained by CTS. As long as the contracts for Monitoring Laboratory and Reference Laboratory are not finalized we have no people to train and no place to calibrate the monitors prior to installation in the field. No installation should be made by CTS without people from the Reference Laboratory and Monitoring Laboratory attending.

Instruments to be used at the measurement site in Giza (at Cairo university) is already in Cairo. These instruments were delivered to the University, and are of the same type as those ordered by the EIMP programme. The plan was to start installing the multigas calibrator at their laboratory and the first monitoring site at the Cairo University. But the University has neither made suitable facilities available for the Monitoring Laboratory nor is the refurbishing of the station finished. The data acquisition system for the monitors of the University of Cairo is based on an Odessa data logger at the station and a PC running Odessa data collecting software at the Computer centre. It is uncertain whether our data collecting software from EMC can communicate with the Odessa data logger.

8 Quality Assurance Procedures

The planning of the quality assurance documentation was initiated during this visit. Several meetings where held with Ulla Lund to agree upon a common documentation layout for both Reference Laboratory and Monitoring Laboratory. The documentation will be written according to ISO Guide 25. The Air quality QA/QC documentation layout will mainly be based on the VKI quality manual.

The documentation is divided into two main parts:

1.QA/QC documentation for the Reference Laboratory
2.QA/QC documentation for the Monitoring Laboratory

The documentation is organized on three levels:

1.Strategic level
A document called The Quality Manual describing quality policy, objectives and commitments, organization and management.

2.Tactical level
A document called the Instructions Manual describing general practices and who is responsible for activities. Each section of the tactical level documentation has an Annexes paragraph which includes references to SOPs and other documentation describing in detail activities and equipment. Most of the referenced documentation is placed in a separate annexes manual. Log books and SOPs are also placed in separate manuals. The tactical level documentation will be used as a guide for finding relevant QA/QC documentation.

3.Operational level
One manual including all standard operations procedures (SOP). In addition there is one manual for each instrument including the instrument's log book. Necessary forms are listed in the SOPs.

The Tactical level Annexes and the Operational level documentation describes when and how activities are carried out. This documentation covers the 'practical' part of the labs' work and will be developed first.

The list in Appendix C shows the contents of the tactical level documentation including references to other documents for both Reference Laboratory and Monitoring Laboratory. So far the list includes only monitors. Procedures for samplers, meteorology sensors and data handling will also be included. The high number of SOPs only reflects the number of areas that must be covered and not necessarily the final number of SOPs. Many SOPs are accompanied by a form which the operator completes to document the procedures. A completed form as example as well as an empty form for copying is included where necessary.

Appendix D shows the format of the Instruction manual.

Appendix E shows an example of an unfinished annex to the Instruction manual.

The format of the SOP manual is not decided yet.

Appendix A

People we met

د. عمرو الصوينى
Dr. Amr El-Soueni

CHEMICAL & TECHNICAL SERVICES
شركة الخدمات الفنية والكيميائيه
سى - تى - اس

٤ شارع معمل السكر جاردن سيتى - القاهرة ت : ٣٥٥٢٥٦٠ فاكس ٣٥٥١٣٥٦
4, Maamal El Sokkar Garden City-Cairo Tel:3552560. Fax: 3551356 -RCC ?

علـى حامـد
Aly Hamed

CHEMICAL & TECHNICAL SERVICES
شركة الخدمات الفنية والكيميائيه
سى - تى - اس

٤ شارع معمل السكر جاردن سيتى - القاهرة ت : ٣٥٥٢٥٦٠ فاكس ٣٥٥١٣٥٦
4, Maamal El Sokkar Garden City-Cairo Tel:3552560. Fax: 3551356 -RCC 2743

Dr. Islam Ibrahim Abdou
G. M., Environment Dept. Manager
Consulting Eng. (FS/PM), International Commercial Arbitrator / Expert
ESCONE (FIDIC), EMJ, CRCICA, ADCCAC, GCCCAC, ACIArb.

The Arab Contractors
OSMAN AHMED OSMAN &Co.

34 Adly St. - Cairo - Egypt
Tel.: 3916043 - 3900918
Fax : 3908123 - 3604754 Cairo
email : arabc 4 @idsc.gov.eg

ARGONNE NATIONAL LABORATORY

9700 South Cass Avenue
Building 203
Argonne, IL 60439-4843

Mohamed I. Sultan, Ph.D. Geochemistry
Project Manager
International Programs
Environmental Research Division

(630) 252-1929
Fax: (630) 252-5498
E-mail: sultan@amoun.er.anl.gov

Cairo University

Dr. Tarek Mohamed El-Araby
Ph.D. in Geophysics

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

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

Appendix B

Siting study

Air quality monitoring network
Site visit report, Helwan

SiteName: Tabbin South (Arab Mosaed school)
Co-ordinates:. UTM: ,

Access/ availability: Along El Naser road south of Tabbin industrial area.

Buildings and rooms available: On the roof of a small building at the entrance of the school.

Area description: Industrial area

Local sources: Smelter, chemical, cement, coke, iron and brick factories

Representativity: Representative for industrial and residential area (random area of 10000 people)

Parameters to be measured: SO_2, PM_{10}, Dustfall

Measurement equipment: Samplers

Infrastructure: Power: 220 V available
Telephone lines:
Sampler/monitor locations:
Air intake: At 3 m above ground

Personnel:

Air quality monitoring network
Site visit report, Cairo

SiteName: Abu Zabel (Roads and bridges authorities)
Co-ordinates:. UTM: ,

Access/ availability: On Ismailia Canal.

Buildings and rooms available: On the roof of the second floor of the maintenance building there is a 2.5 m high wall which is open towards the canal. One corner of the wall can be closed by two walls and a roof.

Area description: Industrial area , residential area

Local sources: Chemical industries, fertilizer, iron and steel factories, workshops

Representativity: Representative of impact from industries and local workshops.

Parameters to be measured: PM_{10}, VOC, Dustfall

Measurement equipment: Sampler.

Infrastructure: Power: 220 V available
Telephone lines:
Sampler/monitor locations:
Air intake: 10 m above ground

Personnel:

Appendix C

Quality assurance documentation - an overview

Quality assurance documentation - an overview.

The list below shows the contents of the tactical level documentation including references to other documents for both Reference Laboratory and Monitoring Laboratory. So far the list includes only monitors.

The following manuals will be created (for codes in ( ) see below):

The Quality Manual (R, M, HEF)
The Instructions Manual (R, M, HEF)
The Annexes to Instructions Manual (R, M, HEF)
The Standard Operations Procedures Manual (R, M, HEF)
The Station Log Book, one per station (M, HF)
The Equipment Log Book, one per instrument (R, M, HF)

To simplify the maintenance of the documentation the manuals will be created as separate documents. As far as possible each manual will consist of only one document on the word processor although some of the forms will have to be made using other programs such as Excel.

Codes in ( ):

R	Reference lab documentation
M	Monitoring lab documentation
R, M	Reference lab and Monitoring lab documentation, different contents
RM	Reference and Monitoring lab documentation, equal contents
A	In Annexes Manual
A-R	Only referenced in Annexes Manual
S-L	Separate documents, Log book Manuals
S-S	Separate document, SOP Manuals
HEF	Header and extended footer on first page. Only header on subsequent pages
HF	Header and normal footer on first page. Only header on subsequent pages

Instructions Manual overview including references to other documentation.

Front Page (HEF)
Contents (R, M)

1. Introduction (R, M)
2. Documentation overview (R, M, HF)
   Annexes:
   2. Documentation overview (R, M, A, HF)
   - Name and location on the computer network of all QA/QC documentation
3. Personnel (R, M, HF)
   Annexes:
   3. Personnel (R, M, A, HF)
   - Organizational chart
   - List of employees
   - List of persons responsible for instruments
   - List of authorized users
4. Facilities (R, M, HF)
   Annexes:
   4. Facilities (R, M, A, HF)
   - List of facilities
   - Facility data sheet
5. Equipment (R, M, HF)
   Annexes:
   5. Equipment (R, M, A, HF)
   5.1. List of equipment (A)
   5.2. Equipment log books (A-R, S-L, HF)
   - Equipment data sheet
   - Log book
   - Calibration sheets
   - Maintenance sheets
   - Product maker's data sheet

   Reference materials
   Measurement methods
   Personnel

6. Reference materials (R, M, HF)
   Annexes:
   6. Reference materials (R, M, A, HF)
   - Traceable chain of calibrations (RM)
   - Description of methods (RM)
   - List of equipment (R)
   - Calibration schedule (R)
   - Maintenance schedule (R)

   Equipment
   Equipment log books
   Personnel
7. Calibration of equipment in the lab (R, M, HF)
   Annexes:
   Reference materials
   Measurement methods
   Equipment
   Equipment log books
   7. Calibration of equipment in the lab (R, M, A-R, S-S)
   7.1. SOPs for calibrating reference gas cylinders in the lab (R)
   - SOP - Calibrating a SO_2 reference gas cylinder (HF)
   - SOP - Calibrating a NO reference gas cylinder (HF)
   - SOP - Calibrating a CO reference gas cylinder (HF)
   - SOP - Calibrating a HC reference gas cylinder (HF)
     Form - Calibrating a reference gas cylinder

   7.2. SOPs for calibrating working gas cylinders in the lab (RM)
   - SOP - Calibrating a SO_2 working gas cylinder (HF)
   - SOP - Calibrating a NO working gas cylinder (HF)
   - SOP - Calibrating a CO working gas cylinder (HF)
   - SOP - Calibrating a HC working gas cylinder (HF)
     Form - Calibrating a working gas cylinder

   7.3. SOPs for calibrating permeation tubes in the lab (RM)
   - SOP - Calibrating a SO_2 permeation tube (HF)
   - SOP - Calibrating a NO permeation tube (HF)
     Form - Calibrating a permeation tube

   7.4. SOPs for calibrating zero/span check units in the lab (RM)
   - SOP - Calibrating a TEI model 1150 zero air generator (HF)
     Form - Calibrating a TEI model 1150 zero air generator
   - SOP - Calibrating a TEI model 102S-2 zero/span check unit (HF)
     Form - Calibrating a TEI model 102S-2 zero/span check unit
   - SOP - Calibrating a TEI model 145 zero/span check unit (HF)
     Form - Calibrating a TEI model 142 zero/span check unit

7.5. SOPs for calibrating monitors in the lab

- SOP - Dynamic calibration of a TEI model 43C SO_2 monitor (HF)
  Form - Dynamic calibration of a TEI model 43C SO_2 monitor
- SOP - Dynamic calibration of a TEI model 42C NO_x monitor (HF)
  Form - Dynamic calibration of a TEI model 42C NO_x monitor
- SOP - Dynamic calibration of a TEI model 47C CO monitor (HF)
  Form - Dynamic calibration of a TEI model 47C CO monitor
- SOP - Dynamic calibration of a TEI model 55C HC monitor (HF)
  Form - Dynamic calibration of a TEI model 55C HC monitor
- SOP - Dynamic calibration of a TEI model 49C O_3 monitor (HF)
  Form - Dynamic calibration of a TEI model 49C O_3 monitor

8. Measurement methods (RM)
   Annexes:
   8. Measurement methods (RM, A, HF)
   - Description of methods
   - Calibration schedule
   - Maintenance schedule

   Equipment
   Equipment log books
   Calibration of equipment
   Personnel
9. Field measurements (R, M, HF)
   Annexes:
   Personnel
   Measurement methods
   Equipment
   Equipment log books
   Reference materials
   Calibration of equipment
   9. Field measurements (R, M, A-R)
   9.1. Station log books (S-L, HF)
   - Form: Station data sheet
   - Form: List of equipment
   - Form: Log book

9.2. Packing lists (S-S)

- Packing list - Station (HF)
- Packing list - Air intake and manifold (HF)
- Packing list - TEI model 43C SO_2 monitor (HF)
- Packing list - TEI model 42C NO_x monitor (HF)
- Packing list - TEI model 48C CO monitor (HF)
- Packing list - TEI model 55C HC monitor (HF)
- Packing list - TEI model 49C O_3 monitor (HF)
- Packing list - TEI model 1150 zero air generator (HF)
- Packing list - TEI model 92S-2 zero/span check unit (HF)
- Packing list - TEI model 145 zero/span check unit (HF)

9.3. SOPs for installing equipment (RM, S-S)

- SOP - Installing an air intake and manifold (HF)
- SOP - Installing a TEI model 43C SO_2 monitor (HF)
- SOP - Installing a TEI model 42C NO_x monitor (HF)
- SOP - Installing a TEI model 48C CO monitor (HF)
- SOP - Installing a TEI model 55C HC monitor (HF)
- SOP - Installing a TEI model 49C O_3 monitor (HF)
- SOP - Installing a TEI model 1150 zero air generator (HF)
- SOP - Installing a TEI model 92S-2 zero/span check unit and permeation tubes (HF)
- SOP - Installing a TEI model 145 zero/span check unit (HF)
- SOP for installing a working gas cylinder (HF)

9.4. SOPs for performing routine maintenance on equipment (RM, S-S, HF)

- SOP - Routine maintenance on an air intake and manifold (HF)
  Form - Routine maintenance on an air intake and manifold
- SOP - Routine maintenance on a TEI model 43C SO_2 monitor (HF)
  Form - Routine maintenance on a TEI model 43C SO_2 monitor
- SOP - Routine maintenance on a TEI model 42C NO_x monitor (HF)
  Form - Routine maintenance on a TEI model 42C NO_x monitor
- SOP - Routine maintenance on a TEI model 48C CO monitor (HF)
  Form - Routine maintenance on a TEI model 48C CO monitor
- SOP - Routine maintenance on a TEI model 55C HC monitor (HF)
  Form - Routine maintenance on a TEI model 55C HC monitor
- SOP - Routine maintenance on a TEI model 49C O_3 monitor (HF)
  Form - Routine maintenance on a TEI model 49C O_3 monitor
- SOP - Routine maintenance on a TEI model 1150 zero air generator (HF)
  Form - Routine maintenance on a TEI model 1150 zero air generator
- SOP - Routine maintenance on a TEI model 92S-2 zero/span check unit and permeation tubes (HF)
  Form - Routine maintenance on a TEI model 92S-2 zero/span check unit and permeation tubes
- SOP - Routine maintenance on a TEI model 145 zero/span check unit (HF)
  Form - Routine maintenance on a TEI model 145 zero/span check unit

9.5. SOPs for calibrating equipment in the field (RM, S-S)

- SOP - Field calibration of a TEI model 43C SO_2 monitor (HF)
  Form - Field calibration of a TEI model 43C SO_2 monitor
- SOP - Field calibration of a TEI model 42C NO_x monitor (HF)
  Form - Field calibration of a TEI model 43C SO_2 monitor
- SOP - Field calibration of a TEI model 48C CO monitor (HF)
  Form - Field calibration of a TEI model 48C CO monitor
- SOP - Field calibration of a TEI model 55C HC monitor (HF)
  Form - Field calibration of a TEI model 55C HC monitor
- SOP - Field calibration of a TEI model 49C O_3 monitor (HF)
  Form - Field calibration of a TEI model 49C O_3 monitor
- SOP - Field calibration of a TEI model 1150 zero air generator (HF)
  Form - Field calibration of a TEI model 1150 zero air generator
- SOP - Field calibration of a TEI model 92S-2 zero/span check unit (HF)
  Form - Field calibration of a TEI model 92S-2 zero/span check unit
- SOP - Field calibration of a TEI model 43C400 zero/span check unit (HF)
  Form - Field calibration of a TEI model 43C400 zero/span check unit
- SOP - Field calibration of a TEI model 145 zero/span check unit (HF)
  Form - Field calibration of a TEI model 145 zero/span check unit

10. Data collection (R, M, HF)
    Annexes:
    10. Data collection (R, M, HF)
    - Description of data flow
11. Data reporting (R, M, HF)
    Annexes:
    11. Data reporting (R, M, HF)
    - Description of data reporting
12. Data control (R, M, HF)
    Annexes:
    12. Data control (R, M, HF)
    - Description of data control

Appendix D

Instruction manual format

Quality Handbook			EIMP
Instructions Manual Personnel Reference Lab - Air	Section Page Date Issue No	: : : :	3 Page 1 of 3 97.06.02 001

3. Personnel

Objective and content

Responsibility

Background material

Process

Aim

Annexes

Authors:	Authorized by:	Managing Director	Quality Manager

97.07.31 I:\EGYPT\QA-HANDB\DOCUMENT\INSTRUCT.DOC

Appendix E

Example of an unfinished annex to the Instruction manual

6. Reference Materials

Description of methods
Ozone monitors are calibrated using an UV photometric ozon calibrator. It consists of an ozone generator and a UV photometer for measuring the generated ozone concentration. A selectable ozone concentration is output. It is used for performing dynamic calibration of ozone monitors.

Other gas monitors are calibrated using a gas dilution unit. It consists of a calibrator, a zero air source and several cylinders containing reference gases at high concentrations. The reference gas is diluted in the calibrator to give a suitable output concentration. It is used for performing dynamic calibration of gas monitors.

List of calibrating equipment
Gas monitor calibrating equipment:

Equipment	Type	Serial number
UV photometer	TEI model 49CPS	
Calibrator	TEI model 146	
Zero air generator for calibrator	TEI model 1150	

The following reference gas standards are used for calibrating gas monitors:

Calibration gas	Reference number	Typical concentration
SO_2	SRM 1694a	100 ppm (µol/mol) in N_2
NO	SRM 1684b	100 ppm (µol/mol) in N_2
CO		5000 ppm (µol/mol) in N_2
CH_4+C_3H_8		200 ppm (µol/mol) in N_2

Calibration schedule UV photometric Ozon calibrator
The photometer is calibrated once a year. The calibrating institution is XX.

Calibration schedule calibrator and reference gas cylinders
The mass flow controllers of the calibrator are calibrated once a year. The calibrating institution is XX.

The zero air generator is calibrated once a year. The calibrating institution is XX.

Authors:	Authorized by:	Managing Director	Quality Manager

Norwegian Institute for Air Research (NILU)
P.O. Box 100, N-2007 Kjeller – Norway

REPORT SERIES	REPORT NO. OR 46/97	ISBN 82-425-0905-0	
OPPDRAGSRAPPORT		ISSN 0807-7207	
DATE 26.8.97	SIGN. Øystein Hov	NO. OF PAGES 40	PRICE NOK 75,-

TITLE	PROJECT LEADER
DANIDA; Air Quality Monitoring Programme Mission 6 Report	Bjarne Sivertsen
	NILU PROJECT NO. O-96013
AUTHOR(S) Leif Marsteen	CLASSIFICATION * A
	CONTRACT REF.

REPORT PREPARED FOR:
COWI/EIMP
EEAA Building, 30 Helwan Street
Maadi, Cairo, Egypt

ABSTRACT
Summaries of the sixth mission to Egypt including meetings and site visit reports. The layout of the Quality Assurance documentation was prepared and a draft is included in the report.

NORWEGIAN TITLE
Overvåkingsprogram for luftkvalitet i Egypt

KEYWORDS		
Air quality	Monitoring	QA documentation

ABSTRACT (in Norwegian)

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