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

Mission 11 Report

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1 Introduction

The 11th mission to Egypt covered the period 21.2- 4.3. 1999. The mission was undertaken by senior scientist Oddvar Røyset in cooperation with Bjarne Sivertsen.

Oddvar Røyset, chemical analysis expert, performed the work carried out in this mission. Of the work programme activities A - I, the following tasks were covered:

E. Training

Follow up the procedures implemented during the 10. Mission, and on the job training at CEHM, Cairo University, for personnel from CEHM and NIS

F. QA/QC

Update SOPs and develop new SOPs to be used in the EIMP Air Quality Manual

H. Reference laboratory

Make recommendations to the preparation of QA standards for SO_4, NO_2 and lead to be used at CEHM

The work in this mission was mainly focused towards the follow up of the methods implemented during the 10. Mission. The work also included on the job training of the staff at the Centre for Environmental Hazards and Mitigation (CEHM) at the Cairo University and the Reflab. Water at Ain Shams University and NIS. The follow up work included training included sampling and chemical analysis methods for NO_2, SO_2, TSP, PM_{10}, passive sampling (NO_2, SO_2) as well as a method for collection of dustfall from the air. New training included implementation of a method for determination of lead in air, based on EPA-procedures, and on quality control and data storage procedures.

2 A. Institutional support

No activity during this mission.

3 B. Design of monitoring programme

No activity during this mission.

4 C. Procurement of equipment, hardware and software

No activity during this mission.

5 D. Data management

No activity during this mission.

6 E. Training

On the job training of the staff at Centre for Environmental Hazards Mitigation (CEHM) at the Cairo University, Giza and NIS. The training waas focused on procedures for data storage, data presentation, data evaluation and quality control for the determination of SO_2, NO_2, TSP/PM_{10} and dustfall (using dust buckets).

The training included one person from the NIS.

The training programme had the activities listed below and was performed by Oddvar Røyset. The preliminary training program schedule is given in appendices.

6.1 22. 2. 1999 - EIMP office

Meeting with Ulla Lund.

- Status of new equipment ordered.
- Determination of lead in air. Procedures recommended by CAIP (Cairo Air Improvement project) were evaluated. It was decided to recommend the procedures from Environment Protection Agency (EPA;
  - 40CFR Ch I(7-1-96), Part 50, appendix G (digestion by nitric acid and determination by flame atomic absorption spectrometry)
  - Method 6010B (ICP-AES, inductively coupled plasma atomic emission spectromentry)
- Arrange meeting with Saad Hassan form Ain Shams Reflab water to discuss QA-QC procedures for SO_4, NO_2, lead.

6.2 23.2.99 - EIMP Office

Prepared procedures for data storage and lead in air.

Meeting with Anwar Ahmed regarding status for new equipment. The status for the new equipment is:

Equipment type		Status pr. 23.2.99
Autosampler for the Dionex DX 100 Ion Chromatograph (recommended the Gilson 222XL type or equivalents)	ca 75000	Under evaluation by dr. Ahmed Soliman/Anwar Ahmed to find a model with the correct specifications.
Water treatment system for production of pure water	ca 50000	In Cairo.
New microbalance for TSP with larger weighing chamber to fit for 10"x8" highvolum filters	ca 25000	It was decided to use a Sartorius balance in the store.
Laboratory shaking machine for the extraction of NO2 tubes	13000-15000	Cairo airport 27.2.99.
Computer	7000	Received Nov. 1998.
Desiccator	1300	Cairo airport 27.2.99.
Filtration equipment for dustfall	3000	Cairo airport 27.2.99.
Volumetric flasks of 1000 ml, 10 units	1500	Cairo airport 27.2.99.

6.3 24.2. 99 - CEHM Cairo University

Discussed possible problems of the analysis procedures implemented in October/November 1998.

Lecture on procedures for data storage and security.

6.4 25.2.99 - EIMP office

Evaluation of data produced by CEHM..

Investigations of the system for VOC.

Evaluations of procedures for lead in air.

6.5 28.2.99 - CEHM, Cairo University

Lecture on procedures for lead in air.

40CFR Ch I(7-1-96), Part 50, appendix G (digestion by nitric acid and determination by flame atomic absorption spectrometry).

Method 6010B (ICP-AES, inductively coupled plasma atomic emission spectrometry.

Discussion of quality control procedures.

6.6 29.2.99 - CEHM Cairo University

Discussions of quality of data produced by the laboratory from November 1998 to January 1999.

- Data for Alex for SO_2 is lower than expected. No obvious reason is found
- Some strange values for Alex in February 1999, high Cl-values (possible seaspray, or burning of Cl-containing plastic trash in the vicinity of the stations).

Method comparison between NILU and CEHM for the determination of NO_2 and SO_2 by passive samplers.

The passive samples for comparison were taken by 2 parallel colocated passive samplers at the Cairo, Abu Zabel station from 21.10.98 to 02.11.98. The following results were obtained for filters leached into 5 ml of solution. The agreement was satisfactory, as the deviations were within 25 %.

		NILU	CEHM	CEHM/NILU
NO_2	µg NO_2/ml	1.13	0.93	0.82
SO_2	µg SO_2-S/ml	1.2	1.49	1.24

Delivered updated Excel templates for the storage and graphical presentation of data for SO_2, NO_2, SO_2-passive, NO_2-passive, TSP/PM_{10}, lead, dustfall.

Further discussions about the Gilson autosampler. Discussions of need for possible new equipment.

6.7 3.3.99 - CEHM, Cairo University,

Lecture on quality control.

Discussions regarding quality of data for SO2 and NO2 in Cairo and Alexandria.

EIMP office

New equipment needs.

Updated EIMP Air quality manual with new procedures.

Prepared lecture on quality control procedures

Writing mission report

Investigation on VOC equipment.

7 F. QA/QC

7.1 SOPs

Follow up and training have been performed for the 8 methods where SOPs was developed, as listed below:

Action	Parameter	Procedure name
Follow up	SO_2	Procedure for sampling and analysis of SO_2 in air by use of a filterpack sampler
Follow up	NO_2	Procedure for sampling and analysis of NO_2 in air. Iodide absorption method
Follow up	Passive SO_2 and NO_2	Procedure for sampling and analysis of NO_2 and SO_2 in air by the use of passive samplers.
Follow up	TSP, PM_{10}	Procedure for sampling and analysis of suspended particulates in air by the use of a highvolume sampler
Follow up	Dustfall	Procedure for sampling and analysis of dust fallout from the air
Updated	QA-QC	EIMP Air Quality QA-QC-procedures
New	Lead	Recommendation for EPA 40CFR50G, EPA 6010B
New	Data	Data storage

7.2 QA/QC samples and presentation

The level of quality control needed was discussed with Ulla Lund, and it was decided that three types of quality control samples was needed, one for $SO_4^{=}$, NO_2^{-} and lead. The two former is recommended to prepare locally by Reflab water, while for lead a commercial standard sample from Spex industries, USA, was recommended. For lead two additonal certified reference materials from NIST (Urban fly ash and Urban particulate matter) was recommended.

The CEHM -laboratory had access to a specially developed program for presentation of quality assurance data. The program is developed by VKI in Denmark and has the name Quality. Personnel from the laboratory have got training on the use of this program, but the program has yet not been implemented for routine use.

8 G. Monitoring

No activity during this mission.

9 H. Reference laboratory

Training of 1 person from the NIS was performed

10 I. Component Co-ordination

No activity during this mission.

Appendix A

People and colleagues

People and colleagues

The following persons participated in the training program

Name	Participation during 11. mission	Location
Dr. Ahmed Soliman Abd Ellah, laboratory manager	X	CEHM
Dr Amany Taher, ass. laboratory manager	X	CEHM
Hany Nabil	X	CEHM
Dr. Gehad Genidy	X	CEHM
Mohammed Abd El Maugood		CEHM
Shireen Ali		CEHM
Kamla Moustafa	X	CEHM
Moustafa Morad	X	CEHM
Mona Moneer		Ain Shams University
Wagdi Mahmoud Khedr		Ain Shams University
Basma Salia	X	NIS

In addition I also had the pleasure to meet

Dr. Tarek El Araby, manager of CEHM	CEHM
Dr. Hesham Mohamed El Araby, manager of information and data analysis laboratory	CEHM

The address for mailing is
Dr. Ahmed Soliman Abd Ellah
Department of chemistry
Faculty of Science
Cairo University
Giza
EGYPT
Tel. 202 567 4843 job (202 518 7785 private)
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Appendix B

E. Training
E1 Preliminary time schedule for training
E2 Lectures given

E1 Preliminary time schedule for training Oddvar Røyset, NILU, Norway, chemical analysis expert.

Sunday 21.2	Arrival in Cairo at about 17:50 with Lufthansa	
Monday 22.2 11:30	Discussions at EIMP office • Status on new equipment ordered. • QA/QC procedures of Ain Shams, how to proceed • Procedure for lead in air - go through EPA docs. and decide which procedure to recommend	 Ulla Ulla Ulla
14:00	• Air section meeting 14:00. Planning of activities	LM,BS,OR, MF, JS
	• Setting up my PC in EIMP network.	EIMP experts
Tuesday 23.2. 09:00 09:13:00 14:00 - 16:00	EIMP office. • Status new equipment • Further planning and preparation of procedures • Visit at CEHM. Staff meeting at 14:00. Making agreements with CEHM staff regarding ORs program. NB. Need a whiteboard and overhead	 Anwar

Wednesday 24.2.
10:00-15:00
	CEHM Cairo University
	Discuss with Ahmed Soliman and co-workers.
	• Status of procedures implemented in Nov. 1998. Discuss possible problems regarding the methods for
	  • SO_2 - Problems with leakage of filterholders for SO_2.
	  • NO_2, passive sampling, dustfall, TSP/PM_{10}.
	• Status of new equipment ordered November.
	• The new microbalance for TSP/PM_{10}
		OR
		Ahmed Soliman
		Armany Taher
		CEHM coworkers
		Ain Shams MM,WMK
		NIS (Basma)

Thursday 25.2 10:00-15:00	Visit at CEHM. Further discussions. • Data storage and data presentations. • Excel reporting tools. It would be fine if all analysis of SO2/NO2/Dustfall/TSP/Passive sampling were entered into Excel and printed out. • Evaluation of data, using data graphs for evaluating quality of analysis. • Data storage procedures (Archives for site forms, worksheets, chromato-grams, storage of data files from ion chromatographs - file structure, backup).	OR Ahmed Soliman Armany Taher CEHM coworkers Ain Shams MM,WMK NIS (Basma)

Sunday 28.2 10:00-15:00	Visit at CEHM. Procedure for determinations of lead (Pb). Go through • EPA 40CFR-50 Part G (digestion and flame AAS-analysis) • EPA 6010B (ICP-AES-analysis)	OR, Ahmed Soliman Armany Taher, CEHM coworkers, Ain Shams MM,WMK NIS (Basma)
Monday 1. 3 10:00 -11:00	EIMP office. Meeting with Saad Hassan from Ain Shams Reflab Water QA-QC procedures for SO_4, NO_2, lead (NIST 1648b). Writing mission report.	Ulla, Saad Hassan
Tuesday 2.3 10:00 - 14:00	Visit at CEHM • QA-QC Procedures for SO4, NO2, lead. • The use of the Quality data program from VKI (Denmark). • Questions about GC method of VOC (canisters, injection)	OR, Ahmed Soliman Armany Taher, CEHM coworkers, Ain Shams MM,WMKNIS (Basma)
Tuesday 2. 3	EIMP office. Writing mission report.	
Wednesday 3. 3 10:00 - 12:00	Visit CEHM. Closure of visit and summing up. Future work.	
Thursday 4.3	Departure Cairo (03:35) to Oslo by Lufhansa	

E2 Lectures given

Lead in particulate matter in air

- EPA 40 CFR 50 part G
  - Cutting of highvolume filters
    - Use a pizza cutter (!) or a scissor
    - Cut out a 1/4 or 1/8 of the filter
    - Be careful not to loose particular material
    - Transfer to a beaker
    - If necessary cut filter into small pieces

Lead in particulate matter in air

- EPA 40 CFR 50 part G
  - Digestion of filters -Hot extraction proc.
    - Fold filter into beaker, add 15 ml of 3.0 M HNO3
    - Boil for 30 min., cool to room temperature
    - Transfer to 100 ml flask
    - Rinse filter in beaker with 40 ml DI. water
    - Transfer to flask
    - Rinse filter twice with DI. water
    - Make up to 100 ml

Lead in particulate matter in air

- EPA 40 CFR 50 part G
  - Analysis by ICP-AES or FAAS
    - Standards 0.1 - 10 µg Pb/ml
      - Prepare from $Pb(NO_3)_2$ salt to 1000 µg Pb/ml stocks
      - Or commercial available standards 1000 µg Pb/ml
    - Matched with the same HNO3-conc as samples
    - Wavelength ICP-AES 220.353 nm
    - Wavelength FAAS 283.3 or 217.0 nm

Lead in particulate matter in air

- EPA 40 CFR 50 part G
  - Quality control
    - Standards from Spex Industries, USA
      - 1000 µg Pb/ml in 1 % HNO3
    - Reference materials from NIST
      - NIST 1633a Coal fly ash

Lead in particulate matter in air

- EPA 40 CFR 50 part G
  - Calculations

$$C_{air}[\mu gPb/m3] = \frac{(C_{Pb} - F_{bl}) \cdot 100ml}{V_a \cdot F_p}$$

Data Storage

- Storage time 5 years
- Data must be available for inspection and easy acces
- Stable storage media
  - Tape
  - CD-ROM
  - ZIP-drive diskettes
  - Mirror harddisk (extra harddisk in PC)

Data storage

- Storage of forms and printouts
- Use binders
  - Site forms
  - Worksheets for instruments
  - Cromatogram printouts

Data storage

- Dionex Peaknet datastorage
  - Major directory YYMM (9901, 9902 etc.)
  - Data directory Comp_MMDD (SO2_0201 etc.)
  - Example directory C:\9901
    - C:\9901\SO2_0201\Peaknet analysisfiles
    - C:\9901\NO2_0203\Peaknet analysisfiles
    - C:\9901\0205\Peaknet analysisfiles

Data storage

- Peaknet database
  - Peaknet stores calcultated results in an MS Access database
  - Stored in "C:\peaknet\database\peaknet.mdb"
  - Each year, make a copy of the database
    - name "peaknet_9901_9912.mdb"
  - Empty peaknet.mdb database each year
  - Backup the database, together with the results on the ZIP drive

Data storage

- Backup system
  - Mirror harddisk
    - Extra harddisk in PC (drive E)
    - Used for copy of drive C
  - ZIP drive diskettes
    - Connected to serial port (or installed in PC)
    - Capacity of about 100 MB
    - Copy for backup storage

Data storage

- Backup procedure
  - Each day
    - Copy new datadirectoory to mirror harddisk
  - Each week
    - ZIP drive copy of YYMM directory of mirror harddisk
  - Each month
    - ZIP drive copy of YYMM directory. Label disk YYMM
  - Each year
    - Store 12 ZIP drives in safe place
    - Empty mirror harddisk and start over for new year

Quality Control

- Field blanks
  - One filter is sent to the station but not exposed
  - One field blank per station per week
  - Mark with a RED LABEL so not mixed
  - Analyse the field blank as a sample
  - Log of field blanks in a Excel workbook and a binder
  - Make action if field blanks increase
  - Use field blanks for estimation of the detection limit. DL=3*standard dev. of field blanks

Quality Control

- Quality Control samples
  - Prepared by another authorised body
    - REFERENCE LAB WATER - AIN SHAMS UNIVERSITY
  - Stock solutions
  - SO4 1000 µg SO4/ml
  - NO2 1000 µg NO2/ml
  - Lead 1000 µg Pb/ml Spex Industries, USA NIST Coal fly ash/Urban part. matter

Quality Control

- Quality control samples
  - Daily working QC-samples
    - SO4 1.00 and 10.0 µg SO4/ml
    - NO2 1.00 and 10.0 µg NO2/ml
    - Lead 1.00 and 10.0 µg Pb/ml
    - Lead digests from NIST reference materials
  - Analyse at least TWICE each day where analysis are performed

Quality Control

- Quality control samples
- Presentation
  - X-Charts Plot of accuracy
    - Plot of results for QC-samples versus time
  - R-Charts Plot of precision
    - Plots of results of difference between parallel 1 and parallel 2 of each QC sample versus time
- Presentation by "Quality program" developed by VKI, Denmark

Quality Control

- Quality control samples
- Action limits
  - Warning limit 2*st.dev. of QC-sample
  - Action limit 3*st.dev. of QC-sample
- Action if
  - 1 result outside Action limit
  - 3 following results outside Warning limit

Quality Control

- Graphical presentation of results
  - High values
    - Contamination ?
    - Sampled for more than one day ?
    - Prefilter black ?
  - Low values
    - Power failure ?
    - Impregnation of filter not OK ?
    - Filter damaged, filter broken ?

Quality Control

- Graphical presentation of results
  - Compare NO_2 and at the same station
  - Compare with neighbouring stations where available
  - Compare with monitor results, daily averages
  - Compare with other environmental parameters
    - Traffic
    - Wind speed and wind direction

Quality Control

- If problems occur
- Make notes
  - in the site forms, which are archived
  - in the Excel analysis workbook
- Make action as soon as possible
- Contact Site responsible person
- Contact laboratory manager
- Fix problems - gather experience on how to avoid problems in the future

Quality Control

- Audit trail logs
  - Archives must be kept in good order
  - All electronic data must be stored in a safe way
- Data availability for at least 5 years for all data of relevance for the quality of the results delivered

Quality Control

- Air Quality Manual
  - Available to users !
  - Always updated with correct version of procedures!
    - Issue no.
    - Revision date
    - Printed date
  - Outdated procedures must be removed from the laboratory and the Air Quality Manual!

Appendix C

F QA/QC
EIMP Air Quality Manual. Standard Operational Procedures for Wet Chemistry analysis methods. New methods implemented during the 11. Mission.

Standard Operational Procedures for Wet Chemistry analysis methods

Determination of lead in suspended particulate matter collected from ambient air	Page 1 of 2 pages
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Determination of lead in suspended particulate matter collected from ambient air

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Determination of lead in suspended particulate matter collected from ambient air	Page 2 of 2 pages
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1. Introduction

The determination of lead in suspended particulate matter in ambient and urban air is performed according to procedures developed by the U.S Environmental Protection Agency -EPA.

The preparation of filters, digestion of filters, are carried out according to the procedure:

40 CFR, Part 50, Appendix G (40CFRCh.I(7-1-96 Edition)). Reference method for the determination of lead in suspended particulate matter collected from ambient air.

The determination of lead in the solution achieved from the digestion, may be achieved in two ways.

Determination by flame AAS according to the method above (40CFRCh.I(7-1-96 Edition)). Alternatively the determination may be performed with inductively coupled plasma atomic emission spectrometry (ICP-AES) according to the method:

Method 6010B Inductively coupled plasma atomic emission spectrometry. Revision 2, December 1996. US EPA.

The latter method is recommended since CEHM have a modern ICP-AES instrument.

2. Quality control

The digestion of particulate matter should be checked by a certified reference material. This material should be digested according to the procedure in (40CFRCh.I(7-1-96 Edition)). Digest 100 mg of the material with 15 ml of the 3 M HNO3 solution used for the digestion of the filters., and dilute to 100 ml. Determine the amount of lead and check against the certified values. The following reference materials from US National Institute for Standards and Technology (NIST) are recommended:

NIST Coal fly ash
NIST Urban particulate matter.

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Procedure for storage of data from chemical analysis in the EIMP project

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Procedure for storage of data from chemical analysis in the EIMP project	Page 3 of 6 pages
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1. Introduction

This procedure describes recommendation for the storage of various data for chemical monitoring systems used within the EIMP project.

1.1 Storage time for archives

It is generally recommended in quality systems that all data should be archived and be available for inspection for at least -5- years. Exceptions for this rule may be where electronic media stores the same data in a safe way.

2. Archives of forms

2.1 Site forms

The site forms shall be stored in binders. It is recommended to save the forms for each site in separate binders. In each binder it is advisable to separate the site forms for different sampling systems.

2.2 Chromatograms

The daily printouts of chromatograms from the ion chromatographs should be stored in binders. If these data are also stored electronically (on tapes or CDs) these paper printouts may not be stored for more than one year.

2.3 Worksheet for chemical analysis

It is recommended to gather the results for the daily analysis on worksheets ("Laboratory worksheeet Ion Chromatography") before they are entered into Excel or laboratory database (LIMS) systems. The Laboratory worksheets should be filled in during the quality assurance control of the chromatograms from the ion chromatographs (or printout from other types of instrumentation).

2.4 Excel data storage and reporting forms

When all data have been properly quality controlled they are entered into the Excel data storage and reporting forms. It is recommended to store the Excel worksheet with data for each year a separate directories on the computer, i.e. "Data1998" etc. The following Excel workbooks are recommended:

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Table 1
Recommended workbooks for storage of data

Report type	Excel file name	Comments
Report SO_2	SO2_template.xls	The Report SO_2 is a Excel workbook with one sheet for data and one for graphical presentation for each site.
Report NO_2	NO2_template.xls	As above
Report Passive NO_2	NO2_passive_template.xls	As above
Report Passive SO_2	SO2_passive_template.xls	As above
Report Dustfall	Dustfall_template.xls	As above
Report PM_{10}	PM10_template.xls	As above
Report Lead	Lead_template.xls	As above
Field blanks	Fieldblank_template.xls	Prepare one sheet for each component in one Excel workbook

2.5 Field blanks

It is recommended to make a separate log of the results for the field blanks, using a separate binder named “Field blanks”. The data should also be stored in an Excel Workbook with graphical presentation (see Table 1). It is of high importance to have a good documentation of these to get a quick overview of the blank values of the sampling and analysis systems.

3. Electronic storage of data

3.1 Electronic storage of data from the Dionex Peaknet chomatography system

It is recommended to prepare a directory structure which facilitates easy access to the rawdata (data for each sample) files from the Dionex Peaknet chromatography system. A directory structure which is efficient is to make one catalogue (directory) for each month containing the year and month, (i.e. YYMM, 9901, 9902, 9903 etc.). Under each of these monthly catalogues a daily catalogue is made where the results for the single day is stored. For convenience these catalogues may be named MMDD plus additional information of choice. The directory structure for February 1999 may thus look like:

Table 2. Example of directory structure

YYMM-catalogue	MMDD-catalogues	Alternative names
9902		
	0201	SO2_0201
	0203	NO2_0203
	…	
	0228	

The analysis results for each sample is in Peaknet stored in an Microsoft Access database under the directory Peaknet/database with the name Peaknet.mdb. During analysis this database aggregates data and may eventually become rather. It is recommended to store this database under a separate name which is used for archiving old data. Depending on the production of data, this may be done on monthly, quarterly or yearly basis. For the EIMP program it is probably sufficient to do the archiving of this database on a yearly basis.The Peaknet.mdb file is thus copied to another name, such as Peaknet_9801_9806.mdb (to take care of data from January to June 1998), or Peaknet_9901_9912.mdb (for the whole year). The original Peaknet database is now emptied for data and new data may now be stored there.

3.2 Permanent electronic storage of data

All data of relevance which are captured non PCs must be stored on permanent storage media. Such media may be an extra harddisk, a tape, a CD or a high capacity floppydisk (a ZIP drive). For convenience we recommend a system consisting of an extra harddisk and a ZIP drive, which facilitates an appropriate data safety with a low cost of work.

3.2.1 Extra Harddisk on Peaknet PC

The production of data from the Peaknet system is rather large. About 100 MB per month is needed, so that a harddisk of 1500-2000 MB is necessary to cover one year. It is recommended to install an extra harddisk on thePeaknet PC (named for example E)

3.2.2 ZIP drive

A ZIP drive is a high capacity floppydisk with a capacity of at least 100 MB per disk. The ZIPdrive may be connected to a serial port on the PC or directly inside the PC, and named drive F. It may be advisable to connect it onto the serial port so that the ZIP drive may be moved between different PCs.

3.3 Procedure for electronic storage

The following procedure should facilitate a good data safety:

Make the same data directories for Peaknet data on the backup harddisk of the PC, i.e. 9901/SO2_0201, 9901/SO2_0202 etc.

For good data safety it is important to copy the Peaknet data directory on the C harddisk to the same directory on the backup harddisk (E) each day.

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At the end of the month the whole directory for that month (i.e. 9901 etc.) is copied to the ZIP drive. Make sure that all the subdirectories is copied to the ZIP drive. The ZIP drive is labeled with month and year and stored in a safe place.

At the end of the year the data are thus stored on 12 separate ZIP drives. The backup harddisk of the PC (E) contains also the 12 monthly catalogues. Check that the monthly ZIP drives contains all the data on the backup harddisk and store the ZIP drives in a safe place.

The data on the backup harddisk may now be deleted, and the backup harddisk is now free to be used for the data created in the future year.

Appendix D

Equipment needs at CEHM

Environmental Information
and Monitoring Programme
EEAA - Danida - COWI
30 Misr-Helwan Str. Maadi, Cairo, Egypt
Tel: 202 525 6442, Fax: 202 526 6447

Memo

To:	**Bjarne Sivertsen**
Copy to:	**Mohammed Fathy, Ahmed El Seoud, Joergen Simonsen, Ulla Lund, Anwar Ahmed**
From	**Oddvar Røyset**
Subject	**Equipment needs at CEHM**
Date:	**03.03.1999**

Equipment needs at CEHM of Cairo University

During my second visit at the CEHM at Cairo University I noticed some shortages of equipment. The equipment listed below, is strongly recommended for the measurements of SO2, NO2 , TSP, PM10 and dustfall measurements for the EIMP project.

Equipment type	Priority	Approximate price DKK
Vacuum pump for VOC canisters	1	max 40000
Injection device for Gas Chromatograph for VOC collected in canisters	1	not available by 03.03.99
Printer	1	ca 5 000
New PC for Ion chromatographs with mirror harddisk, ZIPdrive for backup, ethernetcard, CD write and read, Windows95/98	1	ca 15 000
Vacuum pump for filtration device for dustfall measurements	1	not available by 03.03.99
Upgrade of Peaknet software from 4.0 to version 5.1.	1	not available by 03.03.99

Comments

Vacuum pump for VOC canisters
A vacuum pump is needed for the evacuation of VOC canisters. The pump must be of a special quality - oil free pump (to avoid hydrocarbon contamination of canisters by oil from the pump).

A suitable pump is the type
Vacuubrand MD 4 Vario
Vacuubrand MD 4C Vario

Injection device for Gas Chromatograph for VOC collected in canisters
The Gas Chromatograph used for VOC analysis of VOC canister samples must have an injection device appropriate for injection of gas samples. The detailed specifications of this is not clear at 03.03.99.

Printer
There is a strong need for a printer which should be attached to Ahmed Solimans PC, or the PC where the data for the analysis are stored in the excel worksheet laboratory database. For quality control the graphs for the data achieved for the different stations should be plotted on a weekly basis in order to quickly sort out possible problems.
A laserprinter or equivalent is recommended.

PC for ion chromatographs
The PC on the ion chromatograph is old and do not have facilities for proper data security routines. I recommend strongly to get a new PC for this purpose.
The new PC for Ion chromatographs should contain:
17" monitor
CD-drive with read and write
Harddisk of at least 2 GB
Extra harddisk of at least 2 GB (mirror harddisk)
ZIPdrive for backup
Ethernetcard for communication with ion chromatographs
Windows95/98

With the use of a mirror harddisk and a ZIP drive it is possible to develop good routines for data storage and security.

Vacuum pump for filtration device for dustfall measurements
The laboratory wishes to get a small lowcost vacuumpump for the filtration device used for dustfall samples.

Upgrade of Peaknet software
The current version of the Peaknet chromatography software used at the CEHM laboratory is v.4.0. It is recommended to upgrade to the latest version, v. 5.1., as this version have many new useful features.

Appendix E

VOC method

Instrumentation at CEHM

HP 6890 Series Gaschromatograph.
HP Purge and trap Concentrator for VOCs in water samples.
N2 generator for generating GC carrier gas.
Thermo Environmental Instruments mod 640 VOC steel canister sampler.

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AUTHOR(S) Oddvar Røyset and Bjarne Sivertsen	CLASSIFICATION * A CONTRACT REF.

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

ABSTRACT
The eleventh mission to Egypt on the DANIDA EIMP programme included the final training in handling and analyses of inorganic air quality samples. QA/QC procedures, manuals and data bases were introduced and discussed. Training was a major part of the mission.

NORWEGIAN TITLE

Overvåkingsprogram for luftkvalitet i Egypt

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