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DANIDA
Environmental
Information and
Monitoring Programme
(EIMP).
Air Quality Monitoring
Component,
Installation
Mission 13 Report

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Table of Contents

1	Introduction	3
2	C. Procurement of equipment.	4
	2.1 <i>Procure instruments and equipment</i>	4
	2.2 <i>Prepare instruments for installation</i>	4
3	E. Training	5
	3.1 <i>On the job Training</i>	5
4	F. QA/QC	6
	4.1 <i>QC and calibration as on-the-job training</i>	6
5	G. Monitoring (installation)	7
	5.1 <i>Installations</i>	7
	5.2 <i>Service and repair</i>	12
6	I. Component Co-ordination	13
	6.1 <i>Activity I.2.1 Follow up and administration</i>	13
	Appendix A Comments from daily activities January – July 1999	15
	Appendix B E-mail to EMC Missing wind direction data	29

1 Introduction

This mission number 13 to Egypt lasted from 1 September 1998 to 4 July 1999. The main objective was to prepare and install monitors and samplers in field. Also a considerable amount of the time was spent training field operators at Centre for Environmental Hazard Mitigation (CEHM) at the Cairo University and Institute for Graduate Studies and Research (IGSR) at Alexandria University.

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

The total project includes four components:

- Coastal water monitoring (responsible VKI and COWI)
- Air pollution monitoring (responsible NILU)
- Reference laboratory (responsible VKI)
- Pollution sources and emissions (responsible COWI)

The Air Quality Monitoring Team consisted of Rolf Dreiem, Leif Marsteen, Odvar Røyset and Bjarne Sivertsen. Rolf Dreiem was responsible for the installation of samplers and monitors throughout the whole mission 13.

The objectives of this mission included the following tasks referring to the work programme activities:

- C. Procurement of equipment
Procure instruments where necessary
Prepare instruments for installation
- E. Training
On the job- and laboratory training.
- F. QA/QC
- G. Monitoring
Start monitoring programme.
Establish all monitoring stations in Egypt.
Service and repair
- I. Follow up, meetings and administration

Notes from daily activities are presented in Appendix A.

2 C. Procurement of equipment.

2.1 Procure instruments and equipment

During the installation phase it has been necessary to procure all kinds of equipment. Most of the instruments were ordered during the first phase of the projects. However, several components as well as additional parts and spare parts had to be ordered during installations.

The necessary additional equipment also included calibration gas cylinders with regulators, various stands and air coolers as well as tools, screws and bolts from the local hardware shop. The cost of equipment varied from a few LE up to thousands of LE. More detailed information concerning procurement can be found in earlier mission reports. Responsible for the procurement has been Anwar Ahmed, Procurement Officer at EIMP.

2.2 Prepare instruments for installation

All instruments, samplers and monitors, had to be checked at the storage before transferring them to the Reference Laboratory for calibration. Also at all transfer of instruments checks and controls had to be undertaken to assure that there was no errors in the instruments.

3 E. Training

3.1 On the job Training

On-the-job training of field operators from the Monitoring Institution has been an important part of the tasks during the installation phase.

Every time a new field station was installed and started one or several persons from CEHM or IGSR attended to the work. In this way the responsible engineer for each station received training. The training included assembling all signal cables, all tubing for ambient air monitors and tubing for calibrations and tests.

At the same time the EMC data logger and Station Manager was installed and the set-up was prepared and tested.

Finally the system was tested, calibrated manually and found in good working order. If errors were detected a memo or note was made on the inventory list and a plan was established to correct the part of the station that was not working adequately.

During the first period of operation of the stations the local experts were followed up through weekly meetings and by additional visits to the stations. In this way all engineers from CEHM and IGSR were educated to operate the sites individually.

4 F. QA/QC

4.1 QC and calibration as on-the-job training

In September 1998 the Reference Laboratory personnel at NIS was given training in use of the Wet Gas Meter.

The meter was filled with water and checked for leaks. It was also checked for proper function and found to be working well.

Personnel were trained in use of the meter and calibration of the flow at SO₂ and NO₂ sequential samplers.

The personnel at the Monitoring Institutions were introduced to the QA/QC routines all the time throughout the installation phase. QA/QC is an essential part of the operation of samplers and monitors in the EIMP/EEAA air quality monitoring programme.

5 G. Monitoring (installation)

5.1 Installations

September 1998

No installations done. Control of instrument and station status. Prepared procurement of calibration gases and permeation tubes.
Monitors and sequential samplers calibrated at NIS.

October 1998

AQ-04 Nasr City.

Installed 08.10.98

Sequential air sampler SO₂

Sequential air sampler NO₂

PM₁₀ High volume sampler

Some problem with power supplies after working hour.

AQ-07 Tebbin South.

Installed 13.10.98

Sequential air sampler SO₂

TSP High volume sampler

Dust fall

Station working well.

November 1998

AQ-08 Fum Al-Khalig

Installed 05.11.98

SO₂ monitor

NO_x monitor

CO monitor

NMHC monitor and PM₁₀ monitor is at CTS (warranty repair)

AQ-09 Abu Zabel.

Installed 11.11.98

Passive sampler

Dust fall

Station working well

AQ-33 IGSR-Regional

Installed 23.11.98

O₃ monitor

Meteorological tower

Met. tower was installed earlier.

Station working well.

AQ-29 El Max Petrogas

Installed 24.11.98

Seq. Air sampler SO₂

Seq. Air sampler NO₂

PM₁₀ High Vol. Sampler

Dust fall

Station working well

AQ-32 Gheat El-Inab School

Installed 25.11.98

Seq. Air sampler SO₂

Seq. Air sampler NO₂

PM₁₀ High Vol. Sampler

Station working well.

AQ-31 El Azafra – El Azhar Univ.

Installed 26.11.98

Seq. Air sampler SO₂

Seq. Air sampler NO₂

Station working well.

AQ-28 Abu Qir College

Installed 29.11.98

SO₂ monitor

NO_x monitor

PM₁₀ High Vol. Sampler

Dust fall

Station working well. The station is not located in the plume downwind from the fertiliser factory.

December 1998***AQ-05 Maadi EEAA***

Installed 10.12.98

SO₂ monitor

NO_x monitor

Monitors working well. PM₁₀ High Vol sampler will be installed later on the roof of building by CEHM.

AQ-14 10 Ramadan

Installed 15.12.98

Seq. Air sampler SO₂

PM₁₀ High Vol. Sampler

Dust fall

Station working well.

January 1999

AQ-13 6 October

Installed 11.01.99

Seq. Air sampler SO₂

Seq. Air sampler NO₂

PM₁₀ High Vol. Sampler

Station working well.

AQ-18 El Fayum

Installed 28.01.99

Dust fall

Station working well.

February 1999

AQ-15 Suez

Installed 02.02.99

SO₂ monitor

NO_x monitor

TSP High Vol. Sampler

Dust fall

Station working well

AQ-16 Port Said

Installed 04.02.99

Passive sampler SO₂ and NO₂

First set of sampler lost.

AQ-17 Ismailia

Installed 04.02.99

Passive sampler SO₂ and NO₂

Station working well

March 1999***AQ-27 Sharm El Sheik***

Installed 10.03.99

O₃ monitor

Dust fall

Station working well. 220 V stabiliser installed. Data transferred to CEHM by e-mail.

AQ-40 Kafr Dawar

Installed 24.03.99

Seq. Air sampler SO₂

Dust fall

Station working well

April 1999***AQ-38 El Mansura***

Installed 06.04.99

SO₂ monitor

NO_x monitor

Meteorological tower

Dust fall

Station working well

AQ-35 Kafr El Zayat

Installed 19.04.99

SO₂ monitor

NO_x monitor

PM₁₀ monitor

Dust fall

Station working well

May 1999***AQ-03 Meteorological Institute***

Installed 19.05.99

SO₂ monitor

O₃ monitor

Meteorological tower

Station working well

AQ-39 Domyat

Installed 26.05.99

Seq. Air sampler SO₂

PM₁₀ High Vol. Sampler

Dust fall

Station working well

June 1999

AQ-23 Luxor

Installed 07.06.99

Seq. Air sampler SO₂

Dust fall

Station working well

AQ-24 Edfu

Installed 08.06.99

Passive sampler SO₂ and NO₂

Dust fall

Station working well

AQ-25 Kom Ombo

Installed 09.06.99

Seq. Air sampler SO₂

Passive sampler SO₂ and NO₂

Dust fall

Station working well

AQ-37 El Mahalla El Kubra

Installed 16.06.99

SO₂ monitor

PM₁₀ monitor

Dust fall

Station working well

AQ-36 Tanta

Installed 17.06.99

Seq. Air sampler SO₂

Station working well

AQ-26 Aswan

Installed 26.06.99

SO₂ monitor

O₃ monitor

Portable meteorological tower

Passive sampler NO₂

Dust fall

Station working well

5.2 Service and repair

During this mission there has been some malfunctions and errors on all kind of instruments. Service and repair has been undertaken at the stations when this was possible. In other cases the instruments were brought to the Monitoring Laboratory at CEHM for repair. Personnel from CEHM and IGSR have participated in some of the service actions for training purposes. The instrument experts at CEHM also undertook repair of some instruments.

On 20 June 1999 a visit was made to the EIMP site at the Meteorological Authority in Cairo. The intention by Leif Marsteen and Rolf Dreiem was to inspect the data logger who reports zero for all hourly averaged wind directions.

The data logger was operating on a Station Manager software version 5.5, which had recently been delivered by CTS. No similar problems have been experienced with the previous software versions 5.3, which had been operated at other meteorological stations. CEHM was instructed to change the software to version 5.3 to see whether this would solve the problem. E-mail was sent to the software supplier at EMC describing the problem and asking for a solution. A copy of the e-mail is found in Appendix B.

The old software (version 5.3) has been installed and the wind directions seem to be working well.

The station at El-Mansoura also has the same problem and IGSR is also instructed to change the software to version 5.3.

6 I. Component Co-ordination

6.1 Activity I.2.1 Follow up and administration

This activity is ongoing and includes internal EIMP/EEAA follow up and reporting. Preparation of background information for EIMP project management, input to data and mission reports as well as reporting on daily progress on installations, maintenance, repair and practical problems have been part of this activity.

A number of meetings are held during Mission 13 to Egypt. Weekly staff meetings and weekly air quality project meetings have been the most important for the instrument expert responsible for installations. The weekly air quality project meetings at the Monitoring Institutions have been important for receiving feed back during the installation period. The discussions also gave input to the organisation of the installations and operations of the monitoring network. Some minutes from these meetings are presented in Mission Report no. 12.

Appendix A

Comments from daily activities January – July 1999

Work Notes January 1999.

- 04.01.99** Office work after holiday. Making plans for 6.th October.
- 05.01.99** Transferred 1 NO₂ and 4 SO₂ samplers from NIS to storage. One NO₂ and one SO₂ for 6.th October, the rest of SO₂ samplers are ready at storage (3) for other stations. 1 NO₂ and SO₂ sampler are left at NIS for training and show purposes. NIS will borrow these 2 samplers until EIMP have to put them in work at measuring stations.
- 06.01.99** Office work. Meeting at CEHM with Dr. Tarek and staff. Heba and Dr. Tarek were to busy discussing economy so Yasim and I made one small meeting, planning for the next weeks.
On Monday next week we are going to put up 6.th October, start in the morning from office- go to storage- go to CHEM for Yasim and filters- go to 6.th October.
From 10.01.99 I will start to transfer rack, inlet, computer and accessories from storage and calibrated monitors from NIS to Monitor Lab at CEHM. The Suez station will be put together and tested at Monitor Lab before transportation to Suez as soon as possible after 24.01.99.
- 07.01.99** Office work. Made station log for 6.th October and the last equipment list for the same station. I hope to be able to start early so I can be back as soon as possible due to Yasim and the driver.
- 08.01.99** Friday.
- 09.01.99** Saturday.
- 10.01.99** Staff meeting. Went to storage and put together all equipment for 6.th October. Went back to office and put together papers, tools, drill and other items for 6.th October. Key to station is not marked with a label so I have to bring all unmarked keys to the station.
- 11.01.99** Went to 6.th October City and started the station. The instruments are
SO₂, NO₂ and PM₁₀ High Volume sampler.
The electricity to the station is connected to the same line as the light above the door and is operated by the same switch. This is **not** good since we need electricity 24 hours every day. Must be corrected as soon as possible. Inside the shelter all covers over electrical connectors was not fastened the in a proper way. This is dangerous to the operator of the station. The construction of the ladder (folded) is not made in a way that would prevent children to climb up on the roof and make problems fore the samplers.

- 12.01.99** Went to storage and started sorting out consumable and spare parts. The storage is very dirty and is not suitable for the purpose of sorting spare parts and testing instruments. Anwar promised today that after Ramadan he would make it clean and sort instruments in different groupes.
- 13.01.99** Spent all day in the storage and sorted out spare parts from boxes.
The spare parts were put in the shelves on the wall.
- 14.01.99** **Office** work. Sent mail to Bjarne Sivertsen about his arrival, late in February or early in Mars.
- 15.01.99** Friday.
- 16.01.99** Saturday.
- 17.01.99** Holiday.
- 18.01.99** Monday. Not working day in Egypt.
- 19.01.99** Tuesday. Not working day in Egypt.
- 20.01.99** Wednesday. Not working day in Egypt.
- 21.01.99** Thursday. Not working day in Egypt.
- 22.01.99** Friday.
- 23.01.99** Saturday.
- 24.01.99** Staff meeting. Meeting at CEHM. Transferred SO₂ and NO_x monitors from NIS to CEHM.
- 25.01.99** Transferred all instruments and accessories for Suez station to CEHM. Started assembling instruments and rack. Ordered 5 stands for dust fall and 10 iron rods for TSP sampler from Nassar. 5 original iron delivered to Nassar.
- 26.01.99** Opening of Fum El Khalig. Continue the work on Suez at CEHM.
- 27.01.99** Continued work on Suez station at CEHM. Prepared for El Fayum station.
- 28.01.99** Started El Fayum station. Dust fall and Passive Samplers, SO₂ and NO₂. Really difficult to get permission to start installing. No papers were prepared from EIMP.
- 29.01.99** Friday.
- 30.01.99** Saturday.
- 31.01.99** New 145 Z/S Calibrator taken from storage to CEHM. Need new data cable from logger to PC tomorrow. 145 Calibrator S/N 58298 gives voltages from 5 to 110 on pin 4 and 5. Has to be checked later. Driver went to Suez today bringing with him the money for electricity. In Suez they promised electricity ready by tomorrow 01.02.99.

Work notes February 1999.

- 99.02.01** Final testing of Suez station at CEHM. Had to use an other calibrator (no 110 V on pin 4 and 5). Cable from computer to logger not working all the time. New one from storage. Finally all instruments was put in boxes to be ready for transportation to Suez.
- 99.02.02** Transferred all instruments to Suez and started to put up the station. There was no power connected to the shelter, but a cable outside was ready for connection.
- 99.02.03** Continued putting up the station. Electricity was connected at 1230 PM. Finalised the station in the evening. All instruments were working well.
- 99.02.04** Went to Ismailia. Met El Said in his office on 3. Floor. Installed passive samplers on balcony on the 1. Floor. Went to Port Said and installed passive samplers as in Ismailia. Met Mr. Adel. Office just inside the door to the right. Put up the samplers to the right of the entrance under a wooden roof 4-5 meters from the street.
- 99.02.05** Friday.
- 99.02.06** Saturday
- 99.02.07** Staff meeting. Meeting at CEHM. Inspected PM₁₀ Sampler from Tebbin damaged in a storm. Badly damaged. Have to buy new Critical Flow Device.
- 99.02.08** Office work. TSP transferred to Tabbin South by Maher S/N 650-61495-332. Heba went to Alexandria today. New pump for PM₁₀ monitor to test flow. NO, NO_x and NO₂ from Abu Quir to evaluate results, and testing 110 V on pin 4 and 5 on 145 Calibrator at Abu Quir. Heba will bring test results to me on Thursday.
- 99.02.09** Ordered new Critical Flow Device. Asked Anwar about computer and NO_x monitor witch has been on his desk at the storage for several months. He will take action today. Went to storage to start testing of PM₁₀-monitor, O₃ set-up to Sharm El Sheik and monitors to NIS for calibration. The storage was in a mess and I had to sort out useless boxes and packing materials for the rest of the day.
- 99.02.10** One of the gas cylinders in the storage is labelled O₂ but Anwar claims this cylinder is filled with N₂. This is very dangerous and we can not use this cylinder at all. Started O₃ monitor at storage. This is a new set-up using only internal zero and span from O₃ monitor manually. It is working well. I have to test stability and if I can make it run automatically once every night. Transferred 5 monitors to NIS.

2 SO₂ S/N 43c-61048-329 and S/N 43c-61629-332
 2 NO_x S/N 42c-57636-314 and S/N 42c-61470-332
 1 O₃ S/N 49c-60929-329
 1 CO monitor is still at NIS. The monitor was transported to NIS 98.12.10.
 All instruments are promised calibrated latest 99.02.18.

- 99.02.11** Heba returned from Alexandria. New pump for PM₁₀ monitor returned to storage after testing in Alex. Monitor reading 10000 cc also with new pump. I asked Heba to get 1-min. avg. for 1 week from Abu Qir, all parameters. All I got was NO 1-min. and only 1 hour a day. This is not enough to evaluate instrument condition at Abu Qir. Looking into 1-hour average on Des. 1998 SO₂ and NO₂ monitors are working well. Went to storage and finalised the Suez O₃ stand alone monitor set-up. Monitor was left running during this weekend to check automatically Z/S every night.
- 99.02.12** Friday.
- 99.02.13** Saturday.
- 99.02.14** Staff meeting, office work and meeting at CEHM. Only Dr. Tarek, Maher and Ahmed were present. Yassin and Kamela were not present. Ozonator flow at Ghomoraya was reported too high. Ahmed did not know how high, just a little. He will adjust max. flow limit to 170 cc and put down the numbers next time.
- 99.02.15** Working at storage on O₃ and PM₁₀ monitors. O₃ monitor is ready to install as a stand-alone instrument with internal zero/span. Automatically zero/span once every night and manually once a week. PM₁₀ monitor has a bad electrical connection on the print board on left-hand side. Must be repaired by CTS as soon as possible. Monitor S/N is 58029.
- 99.02.16** Office work.
 Fax sent to CTS included PM₁₀ monitor Alexandria.
 This monitor has to be followed up very closely, at least once a week. Dr Tarek called. He told me that M. Nasars work at Shobra El Kheima was in good order referring to Kamela.
- 99.02.17** Meeting with CTS in office. Agreements on repairing 2 PM₁₀ monitors, One computer and one NO_x monitor at storage, and one 102-s calibrator at Fum El Khalig.
- 99.02.18** Transferred 102-S calibrator from Fum El Khalig to CTS.
 Office work. Ozone set-up tested and ready at storage. PM₁₀ monitor S/N 58035 ready to start testing at storage.
- 99.02.19** Friday.
- 99.02.20** Saturday.

- 99.02.21** Staff meeting. Repair workshop at CEHM. TSP sampler from Tebin does not work any more. New motor from damaged sampler to TSP at Tebin. Installation this week.
- 99.02.22** Bjarne arrives. Gemhoroya, NO_x do not work. Has to be transferred to CEHM for repair. Component meeting at EIMP.
- 99.02.23** Office work. Meeting at CEHM.
- 99.02.24** Prepare repair and training NO_x monitor at CEHM. Repair and test instructions on temperature made and sent to Alex (fax).
- 99.02.25** Training and repair at CEHM. Flow system in monitors.
- 99.02.26** Friday.
- 99.02.27** Saturday
- 99.02.28** Transferred monitors to NIS for calibration. Meeting at CEHM.

Work Notes March 1999.

- 99.03.01** Meeting in Alexandria at IGSR. Change temperature sensor and net. rad. at Alex. Background.
- 99.03.02** Change minutes counter on high volume sampler at Gheat El Inab. The pressure recorder did not work. These 2 instruments were taken to CTS in Cairo for repair. SO₂ was calibrated with trawling standard. SO₂ monitor was so good that it did not need any change in calibration factors.
- 99.03.03** Met Nasr at storage and received 5 stands for Dust Fall and 5 stands for High Volume samplers. Nasr also got meteorological tower for El Mansura. Prepared Station Manual and Station logbook for Sharm El Sheik.
- 99.03.04** Looked into the problem with elevated zero on CO-monitor at NIS. A new monitor was used and no direct answer was found. This problem has to be investigated on a used CO-monitor. (Fum El Khalig).
- 99.03.05** Friday.
- 99.03.06** Saturday.
- 99.03.07** Transferred instruments to NIS for calibration. Transferred instruments to storage from NIS (calibrated). Office work. Meeting at CEHM.
- 99.03.08** Preparing for Sharm El Sheik.
- 99.03.09** Went to Sharm El Sheik.
- 99.03.10** Installed Sharm El Sheik. Ozone monitor S/N 60931-329. Data logger system EMC and dust fall. There are 3 persons responsible:
1. Ahmed Ibrahim (not present)
 2. Waleed Morsy (present)
 3. Hany El Shaer (present)

- WM and HS were given training in using the data logger and weekly maintenance of Ozone monitor.
- 99.03.11** Trawling to Cairo.
- 99.03.12** Friday.
- 99.03.13** Saturday.
- 99.03.14** Staff meeting. Office work. Meeting at CEHM.
- 99.03.15** Transferred the last 3 racks to CEHM for assembly. Repair and training with Kamela at Fum El Khalig.
- 99.03.16** Training at monitor lab in cleaning and adjusting the measurement system on CO monitor with Yassin.
- 99.03.17** Office work. Fuses 2 and 3 Amp form storage to CEHM as spare parts.
- 99.03.18** 3 SO₂ and 1 O₃ monitor transferred from storage to NIS for calibrations. 2 SO₂ and 1 O₃ from NIS to storage, calibrated.
- 99.03.19** Friday.
- 99.03.20** Saturday.
- 99.03.21** BS arrive. Staff meeting, meeting at CEHM.
- 99.03.22** To Alexandria. Adjusting temperature “rate of change” from 4 to 5 deg. C. this should solve the problem of 0-readings fore some hours during some nights. Test this setting this and next week. Start work on O₃ monitor Z/S.
- 99.03.23** Went to Abu Qir. Change the 145-calibrator. Old 145-calibrator is going directly to CTS in Cairo for repair. Put in new set-up in the computer and tested Z/S manually and automatically every night at 2 am. All instruments at Abu Qir are no working very well. Continued and finalised work on O₃ Z/S at IGSR. Now it is working very well.
- 99.03.24** Went to Kafr Dawar and put up sequential sampler and dust fall. CEHM has forgotten to put labels on all filter holders (24) for Kafr Dawar. I left dust fall collector inside the shelter. The sampling of dust fall will start at April 1. 1999. Went back to Cairo. Mohammed Mamdoua is responsible for the station.
- 99.03.25** Office work after trip to Alexandria.
- 99.03.26** Friday.
- 99.03.27** Saturday.
- 99.03.28** Not working day.
- 99.03.29** Not working day.
- 99.03.30** Not working day.
- 99.03.31** Transferred 5 monitors from NIS to storage. Planning installation for the next stations. Went down town Cairo with Anwar to by safety belt for all 6 meteorological towers.

Work Notes April 1999.

- 99.04.01** Prepare El Mansura.
- 99.04.02** Friday.
- 99.04.03** Saturday.
- 99.04.04** Office work. Planning and preparation for El Mansura. Staff meeting and meeting at CEHM cancelled. Transferred rack from CEHM to storage ready for installation in El Mansura. Prepared instruments at storage. 1 PC, 1 NO_x monitor and 1 Calibrator 145 was transferred from CTS to storage. 1 PM₁₀ Monitor inc. pump and inlet transferred to CTS.
- 99.04.05** Note from Anwar telling me that there is **NO POWER** available at shelter in El Mansura yesterday. The installation schedule is now delayed due to infrastructure in Egypt. I was told 2-3 weeks ago that electricity was connected in Mansura. MF said that I had to come to the office to pick up AES before going to El Mansura next day. Finalised the rest of Mansura station at storage.
- 99.04.06** Put El Mansura station on a truck and went to office at 10 am. Had to wait until 1130 am for AES, and was informed by MF that AES needed my car next day to visit other stations in the delta. It is very difficult to put up a station without a car and a driver even if I have the possibility of using TAXI. I can not send a taxi to get nuts or screws locally if I need some. The man from IGSR is under training so he can not go on his own and leave me continuing work. This means that it is **ABSOLUTLY** necessarily for me to have a **COMPANY CAR** when I am putting up stations. Arrived El Mansura at 2 PM and brought all instruments up on the roof besides the shelter.
- 99.04.07** Started at 9 am and waited fore electricity until 11 am. AES left at 10 am with company car. Worked until late afternoon.
- 99.04.08** Continued putting up all instruments and on the job training until 6 PM. At this time all instruments were working well and the station was completed. Due to delay in electricity connections and no company car on 4 Apr 99 the training did not have the quality that is usual fore a complex station as El Mansura. Arrived Cairo close to 9 PM.
- 99.04.09** Friday.
- 99.04.10** Saturday.
- 99.04.11** Staff meeting. Meeting at CEHM. Office work. Planning.
- 99.04.12** Not working day in Egypt.

- 99.04.13** Planning Kafr El Zayat. To storage and started on PM₁₀ monitor who is not working! Due to long time out of operation backup battery is empty and all programmed information is lost. Has to be reprogrammed to measure the correct flow.
- 99.04.14** Early to storage and started work on PM₁₀ monitor. The monitor is now working well. Started to put together the rest of equipment for Kafr El Zayat. Left storage at 6 pm by taxi.
- 99.04.15** Put together logbooks for Kafr El Zayat. Still missing 24 V power supply for solenoid valves on air intake. This was ordered 8 weeks ago. Went to storage to finalise all equipment for Kafr El Zayat.
- 99.04.16** Friday.
- 99.04.17** Saturday.
- 99.04.18** Staff meeting. Last preparation for Kafr El Zayat. Meeting at CEHM.
- 99.04.19** Went to Kafr El Zayat. Made station ready for installation. Nearest hotel in Tanta, New Hotel Arafa.
- 99.04.20** Installed Kafr El Zayat. Driver came from Cairo bringing one missing power supply (locally made). This power supply did not work. 24 volt DC drooped to 3 V under the load of solenoid valves. Tested on 2 different valves and I got the same results. Brought power supply back to Cairo on return.
- 99.04.21** Finalised Kafr El Zayat station. All is working well except for the solenoid valves due to the 24 V DC transformer (not working). Training undertaken by Mohamed Mamdoh, IGSR.
- 99.04.22** Office work. Starts assemble bits and pieces to make the station Mahalla ready for installation next week.
- 99.04.23** Friday.
- 99.04.24** Saturday.
- 99.04.25** Not working day in Egypt.
- 99.04.26** Mahalla will not be ready. No shelter, air condition or electricity. Start to work on instruments for Domyat instead of Mahalla. Meeting at CTS tomorrow at 1600 to discuss PM₁₀-monitor from IGSR.
- 99.04.27** Nasr did not succeed in installing shelter in Domyat. This installation has also to be done later. Files for Domyat is ready. Starts on making preparation for Assyut stations and to put up Assyut 1 up at CEHM. Meeting at CTS. The PM₁₀-monitor is no working well after reprogramming the system constants. The PM₁₀-monitor will be put up in Alexandria on 3 May 99. CTS asked if they could borrow the Foil Calibrator?
- 99.04.28** Made all instruments for Assyut ready at storage.

- 99.04.29** Transferred Assyut station and 2 dust fall to CEHM. I got 1 Foil Calibrator from Dr Tarek and this was taken to CTS on my way to office.
- 99.04.30** Friday.

Work notes May 99.

- 01.05.99** Saturday.
- 02.05.99** Staff meeting. Office work. Meeting at GEHM. Went to CTS to pick up PM₁₀-monitor. Made a Foil Calibration of the Beta Count. Standard is 6087 and the result was 6078. This is well within the limits of +/- 0.25 %.
- 03.05.99** To Alexandria at 0800 in the morning. Installed PM₁₀-monitor at IGSR station. The monitor was working well and the "system constant" is 20450. Meeting at 1500 with IGSR staff. Inspected met. and O₃. The temperature gives some hours of zero readings at night. The "rate of change" is 10. This has to be investigated later. Arrived Maadi at 2130.
- 04.05.99** Office work.
- 05.05.99** Holiday.
- 06.05.99** Holiday.
- 07.05.99** Friday.
- 08.05.99** Saturday.
- 09.05.99** Holiday.
- 10.05.99** Holiday.
- 11.05.99** Office work. Prepare files for Met Authority.
- 12.05.99** Training at CEHM. Put together Assyut station. CEHM needs more training before they can go to Assyut on their own.
- 13.05.99** Seminar at Sofitel.
- 14.05.99** Friday. **Bjarne leaves Cairo.**
- 15.05.99** Saturday.
- 16.05.99** Staff meeting. Office work. Meeting at CEHM. Some calibration sheets handed over to CEHM.
- 17.05.99** Prepare instruments for Met. Authority; AQ-03.
- 18.05.99** Started installing Met. Authority. All people from CEHM participated in installation to get some training in installing meteorological sensors and met. translator.
- 19.05.99** Finalised installation at Met. Auth. Station working well. Zero- point SO₂ is low (-20 mv). Kamela who is responsible for this station will correct this during the next visit.
- 20.05.99** Office work. Finalised paper work for Met. Authority. Made preparations at storage for Domyatta and El-Mahalla. Left storage at 1900 hrs.
- 21.05.99** Friday.

- 22.05.99** Saturday.
- 23.05.99** Staff meeting. Meeting at CEHM. Dr Tarek did not attend the meeting. Only technical problems were discussed.
- 24.05.99** Preparation for Domyat and repair of NO_x monitor in Mansura. Calibration curves and sheets and inventory list is sorted on every station in Alex and Delta. Hassan will take the papers to Alex.
- 25.05.99** Went to Domyat and met Hassan from IGSR, Alexandria. Made all preparations to start installing next morning.
- 26.05.99** Installed PM₁₀ high volume sampler and SO₂ sequential sampler in shelter. Went to Mansora.
- 27.05.99** Started to repair NO_x monitor at Mansora station. The monitor reported zero flow on ozonater and was not working. Training was given to Hassan in troubleshooting and repair. There is a problem concerning the wind direction. Voltage and instantaneous direction is OK but 1 min. values goes to more than 360 degrees. Due to this there is no 5 min or 1 h readings. Have to look into this problem as soon as possible.
- 28.05.99** Friday.
- 29.05.99** Saturday.
- 30.05.99** Staff meeting, office work and meeting at CEHM.
- 31.05.99** Made log books for Mahalla, Luxor and Kom Ombo. Office work.

Work notes June 99.

- 01.06.99** Office work. Planning the trip to Upper Egypt. Tested laboratory power supply 24 V on solenoid valves at Monitoring Lab, CEHM. Working well.
- 02.06.99** Laboratory power supply 24 V for solenoid valves is handed over to Anwar. Within a few days he will go to Alexandria and bring the power supply to Mohammed Mamdoa. Inside the box is installing instructions, for Kafr Zayat station. Went to NIS and picked up the last sequential sampler that had to be calibrated in this installing phase. There are 2 sequential samplers left at NIS (NO₂ and SO₂). These samplers are BACKUP SAMPLERS and are at NIS for training and calibration reasons. (Ref. Ulla Lund). Went to storage and prepared instruments for Luxor, Edfu and Kom Ombo.
- 03.06.99** Office work. Made logbooks for Tanta stations AQ-36. Air con at Mahalla is being installed today, Anwar says.
- 04.06.99** Friday.
- 05.06.99** Saturday.
- 06.06.99** Trawling to Luxor.
- 07.06.99** Installing Luxor.

- 08.06.99** Drive to Edfu. Install dust fall in Edfu. Drive to Aswan.
- 09.06.99** Install Kom Ombo.
- 10.06.99** Travelling to Cairo.
- 11.06.99** Friday.
- 12.06.99** Saturday.
- 13.06.99** Portable met. tower moved from Shobra El Keima to storage. Office work. Meeting at CEHM.
- 14.06.99** Prepare Tanta and Mahalla stations.
- 15.06.99** From storage to Mahalla and started to install Mahalla station. Stayed the night in Tanta.
- 16.06.99** Finalised installation in Mahalla. Electricity in Mahalla is noisy and unstable. SO₂ monitor is working well but we can clearly see the noise on PM₁₀-monitor. The station needs a stabiliser. Access to the station is very difficult and we had to by 20 meter of rope to pull the instruments up and inside the station.
- 17.06.99** Tanta station was put up with a SO₂ sequential sampler. Returned to Cairo in the afternoon.
- 18.06.99** Friday.
- 19.06.99** Saturday.
- 20.06.99** To Met. Auth. station trying to sort out the problem concerning wind direction measurement. The Station Manager Version 5.5 does not work on wind directions. It gives 1-min. averages of more than 400 degrees. CEHM are no instructed to install old version of Station Manager (5.3). Meeting at CEHM.
- 21.06.99** Changed SO₂-monitor at Maadi station. Need monitor with internal Z/S in Aswan. Prepared Aswan station at storage, put all instruments in Ahmeds car and he started for Aswan.
- 22.06.99** Prepared Manuals and log books for Aswan and Assyut stations. Prepared the travel to Aswan. Flying to Aswan in the evening.
- 23.06.99** Started SO₂, O₃, dust fall and Portable Met Tower in Aswan.
- 24.06.99** Tested all systems and finalised the station. Maher and Mahmod got training in operating the station. Flew to Cairo in the evening.
- 25.06.99** Friday.
- 26.06.99** Saturday.
- 27.06.99** Staff meeting, office work and meeting at CEHM.
- 28.06.99** Moved out of flat in Maadi. Preparing trip to Alexandria.
- 29.06.99** Went to Alexandria. Meeting with IGSR staff. Temperature on IGSR background station did not work. Cables was moved to wrong places in connector box and there was no connection from temperature sensor to data logger. Corrections were made and a new temperature probe was installed. Temperature OK. Handed over stabiliser for Mahalla station.
- 30.06.99** Office work.

Work notes July 1999.

- 01.07.99** Office work, Mission report.
- 02.07.99** Mission report.
- 03.07.99** Saturday
- 04.07.99** Travelling to Norway.

Appendix B

E-mail to EMC Missing wind direction data

From: eimp@intouch.com Sent: Su 99.06.20 16:14
To: emc@emcslo.com
Subject: Erratic Wind direction readings in data logger

Dear Sirs,

Introduction

The EIMP project in Egypt uses the EMC Model SM-2000 Station Manager Data Logger to collect data at some 20 measurement sites. In the latest shipment of data loggers the data logger software was updated from v.5.3 to 5.5. Using v. 5.5 to collect wind direction data from a MetOne translator are causing problems. The Wind Direction is not recorded correctly. This is the situation at all our meteorological stations using v.5.5 (2 stations). At our earlier installations (2 stations) we are still using v.5.3 and has not experienced similar problems.

Documentation of logging of wind direction

These are the formats used:

Prm, Avg, InpCh, DataFmt, Units,FScale, Zero, MaxV, MinV, FSV, 1Min, 1Hr, RofCh
WDA, Scalar HWD, 12, DDD.D, DEG, 360, 0, 361, -1, 1 v, 40, 40, 400

- We have tried using a copy of the setup from a station that is working properly without luck.
- We have configured a new setup using one of the default setups delivered with v.5.5 without luck
- The instantaneous voltage readings varies between 0 and 1.009 Volts.
- The instantaneous wind direction reading varies from 0 to 360 degrees.
- The one minute averages varies from 0 to well over 400 (four hundred) degrees, even though none of the instantaneous readings are above 360 degrees.
- The one our averages equals 0 all the time, probably because the one minute averages above 360 degrees are rejected.

Here are some instantaneous voltage and wind direction readings. The readings are not correct to the last decimal due to problems with recording one second updates.

Some good readings:

0.997 V - 358 Deg
0.015 V - 5.3 Deg
0.505 V - 181.9 Deg
0.605 V - 217 Deg

Some strange readings:

0.67 V - 1 Deg
0.34 V - 7 Deg
0.68 V - 5 Deg
1.009 V - 2.1 Deg
1.004 V - 1.3 Deg
0.6 V - 7 Deg
0.3 V - 1.7 Deg
0.3 V - 1.8 Deg
0.34 V - 3 Deg

There are at least two problems:

- 1) It seems like voltage readings around 0.6 and 0.3 V are converted to strange degrees values some times.
- 2) The one minute averages varies from 0 to well over 400 (four hundred) degrees, even though none of the instantaneous readings are above 360 degrees.

What we will do immediately is to replace v.5.5 of the software with v.5.3 which is working ok. Could you please look into the problems.

Best regards,

Leif Marsteen and Rolf Dreiem
Air Pollution Specialists

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