MONITORING REPORT FORM (CDM-MR)
Version 01 - in effect as of: DD/MM/YYYY

CONTENTS

MONITORING REPORT
Version 1 – 13/07/2010

Catalytic N_2O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co
UNFCCC 0490
Monitoring Period # 14: 01/04/2010 – 30/06/2010

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

>>

1. Carbon Egypt has implemented a project for GHG emission reduction by catalytic N_2O destruction in Abu Qir, Egypt. The project is categorized as large scale project under sectoral scope 5: "Chemical Industry". The Host Party for the project activity is the Republic of Egypt. The Project Activity includes development, design, engineering, procurement, finance, construction, operation and maintenance of a system for catalytic reduction of N_2O. The EnviNOx® process used in the Abu Qir II nitric acid plant is based on the catalytic reduction of NO_x (NO and NO_2) with ammonia (NH_3) and of nitrous oxide (N_2O) with a hydrocarbon. The hydrocarbon used is natural gas of which the main constituent is methane (CH_4). The reactions take place over two iron zeolite catalyst beds.

2. In this project, CARBON Egypt installed the EnviNOx® system for catalytic reduction of NOx and N_2O additionally to the equipment at the nitric acid manufacturing plant. The project activity reduces the GHG emissions, which would otherwise be released to the atmosphere, if the project was not implemented. The implementation of the N_2O destruction project at AFC involves that natural gas, a mixture of hydrocarbons of which the main constituent is methane (CH_4), is employed as a reducing agent for N_2O removal.

3. The EnviNOx® system was installed in September 2006 and the catalytic reduction process of N_2O started its operation in October 2006.

4. Total emission reductions achieved in this monitoring period: **371,891 tCO_2e**

A.2. Project Participants

>>

Name of Party involved	Project participants (as applicable)	Party involved considered as project participant
Arab Republic of Egypt (Host)	CARBON Egypt Ltd.	No
Republic of Austria	KOMMUNALKREDIT PUBLIC CONSULTING GmbH Energie AG Oberösterreich	No
Federal Republic Germany	RWE Power AG	No

Project applicant, developer and sponsor is **CARBON Egypt Ltd.** (furthermore called "CARBON"). CARBON Egypt Ltd. is registered under the laws of the Arab Republic of Egypt. The company is a subsidiary of CARBON Projektentwicklung GmbH, Austria and RWE Power AG. CARBON Projektentwicklung GmbH was founded as a limited liability company located and registered in Austria under Austrian law in order to develop, finance and operate high quality JI/CDM Projects. CARBON Projektentwicklung GmbH has vast experience with CDM-Project development in Africa, Latin America and Asia and is specialized on the catalytic N_2O destruction in the tail gas of nitric acid plants.

Kommunalkredit Public Consulting (KPC) was appointed for the Programme Management on behalf of the Austrian Ministry of Agriculture and Forestry, Environment & Water Management. The Programme is operational since August 2003.

Energie AG Oberösterreich (Energie AG) is the leading infrastructure group in the region of Upper Austria. Energie AG with its subsidiary companies works in the fields of energy, water and disposal, both in Austria and abroad.

The RWE Group is one of Europe's leading integrated electricity and gas companies. **RWE Power AG** is the continental power generation company within the RWE Group and Germany's biggest power producer. RWE Power has a diverse generation portfolio including lignite, hard coal, nuclear energy, gas and renewable sources such as hydro, wind and biomass. RWE invests and participates actively in projects under the Clean Development Mechanism and Joint Implementation. The RWE team combines a track record in global commodities and emissions trading as well as risk management with broad experience and a deep understanding of specific risks inherent in CDM and JI projects.

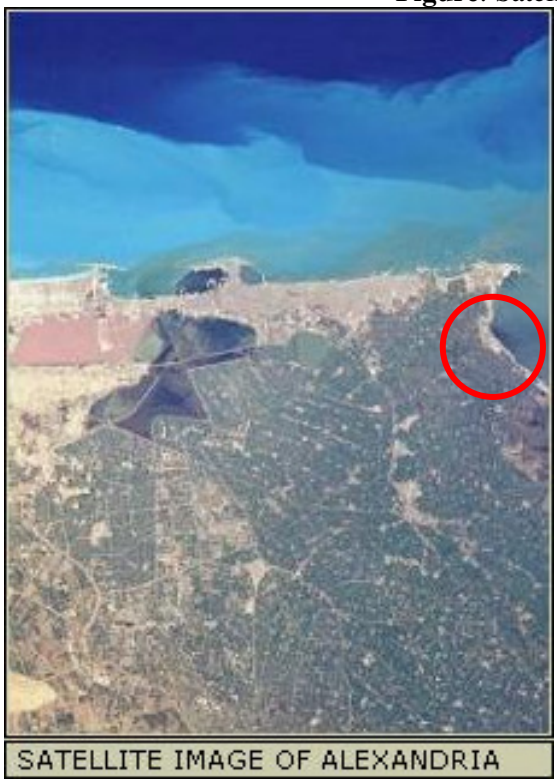
Host Country is the Arab Republic of Egypt. The Arab Republic of Egypt ratified the Kyoto Protocol in January 2005. The other Party involved in the Project at the time of registration is the Republic of Austria. Subsequent to the registration of the Project, Federal Republic Germany has been added as a Party involved in the Project.

Focal point:
The project participants agreed that CARBON Projektentwicklung GmbH, Austria serves as focal point of communication with the Executive Board and the UNFCCC Secretariat.

A.3. Location of the project activity:

>>
Town: Abu Qir
Province: AI-Iskandariyah Province (Alexandria Province)
Country: Arab Republic of Egypt
GPS coordinates: N31.272513° E30.09755°

Figure: Satellite Image of Alexandria



Alexandria a city of 3.9 million inhabitants (2003 estimate) is situated on the Mediterranean Sea, with Lake Mariout two kilometres inland. The city is a commercial and economic centre, and about 80% of all of Egypt's imports and exports go through its harbours. Alexandria is also a very important tourist resort, with a 20 km long waterfront, serving the rich and the middle class of Cairo while the summer heat makes living in the capital unpleasant.

AFC, the largest fertilizer company in Egypt, is located about 15 km east of downtown Alexandria, in a rural area, approximately 5 km outside the small town of Abu Qir. Abu Qir is situated north-east of Alexandria, bordering the suburbs of Alexandria. AFC is located on the shores of the Mediterranean Sea. The company has road and rail access as well as a nearby ship loading terminal.

A.4. Technical description of the project

>>

The Project Activity includes development, design, engineering, procurement, finance, construction, operation and maintenance of a system for catalytic reduction of N_2O. The EnviNO_X® process used in the Abu Qir II nitric acid plant is based on the catalytic reduction of NO_x (NO and NO_2) with ammonia (NH_3) and of nitrous oxide (N_2O) with a hydrocarbon. The hydrocarbon used is natural gas of which the main constituent is methane (CH_4). The reactions take place over two iron zeolite catalyst beds.

General Introduction:

Nitrous oxide (N_2O) is an unwanted, invisible and previously neglected by-product of the manufacture of nitric acid. It is formed alongside the main, desired product nitric oxide (NO) during the catalytic oxidation of ammonia in air over noble metal gauzes. The production of nitric acid takes place in three main process steps as indicated by the following reactions:

1. Ammonia (NH_3) combustion to form nitric oxide (NO)[1]:

   $4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$ (main reaction 1) **(1)**

   Simultaneously nitrous oxide (N_2O), nitrogen (N) and water (H_2O) are formed as well, in accordance with the following equations:

[1] Ammonia is reacted with air on noble metal catalyst in the oxidation section of nitric acid plants. Nitric oxide and water are formed in this process according to the above mentioned main equation.

$4\ NH_3 + 3\ O_2 \rightarrow 2\ N_2 + 6\ H_2O$ (side reaction 1) **(2)**
$4\ NH_3 + 4\ O_2 \rightarrow 2\ N_2O + 6\ H_2O$ (side reaction 2) **(3)**

NO yield mainly depends on pressure and temperature in the ammonia oxidation process and is usually in a range of 95% to 97%.

2. NO is oxidised to nitrogen dioxide (NO_2):

$2\ NO + O_2 \rightarrow 2\ NO_2$ (main reaction 2) **(4)**

3. (According to the technical process) Absorption of NO_2 in water to form nitric acid (HNO_3):

$3\ NO_2 + H_2O \rightarrow 2\ HNO_3 + NO$ (main reaction 3) **(5)**
(NO is oxidised to NO_2 according to main reaction 2)

Description of catalytic reduction process:
Although the term catalytic reduction nowadays has a more general definition in terms of the transfer of electrons, the following definition is sufficient for present purposes: catalytic reduction of N_2O occurs when reactions take place between N_2O and other substances in contact with a catalyst, such that the oxygen is removed from the N_2O molecule and forms one or more compounds with other species. The substance or substances that react with N_2O to remove oxygen are termed reducing agent. A general reaction equation for the catalytic reduction of N_2O can be given as:

$$n\ N_2O + x\ RA \rightarrow n\ N_2 + y_1\ P(1)O_A + y_2\ P(2)O_B + ...+ z_1\ Q(1) + z_2\ Q(2) + ... \quad \textbf{(6)}$$

where RA is a molecule of the reducing agent, $P(1)O_A$, $P(2)O_B$ are the compound formed by reaction with the oxygen of the N_2O and Q(1), Q(2) represent further products of the oxidation reaction, n, x, y_1, y_2, z_1, z_2 are the appropriate stoichiometric coefficients.

Project Specific description:
Principles of the EnviNO_X® process
The reactions take place over two iron zeolite catalyst beds. The first bed contains an iron zeolite that is especially effective in catalysing the reduction of NO_x with ammonia according to such reactions as:

$6\ NO_2 + 8\ NH_3 \rightarrow 7\ N_2 + 12\ H_2O$ **(7)**
$6\ NO + 4\ NH_3 \rightarrow 5\ N_2 + 6\ H_2O$ **(8)**
$NO + NO_2 + 2\ NH_3 \rightarrow 2\ N_2 + 3\ H_2O$ **(9)**
$4\ NO + O_2 + 4\ NH_3 \rightarrow 4\ N_2 + 6\ H_2O$ **(10)**

Effectively all the NO_x is removed. Furthermore some destruction of N_2O occurs.

Equations showing reduction N_2O with methane:
The second and main bed contains an iron zeolite that is particularly efficient in catalysing the reduction of nitrous oxide with methane.

$CH_4 + 3\ N_2O \rightarrow CO + 2\ H_2O + 3\ N_2$ **(11)**

$$CH_4 + 4\ N_2O \rightarrow CO_2 + 2\ H_2O + 4\ N_2 \qquad \textbf{(12)}$$

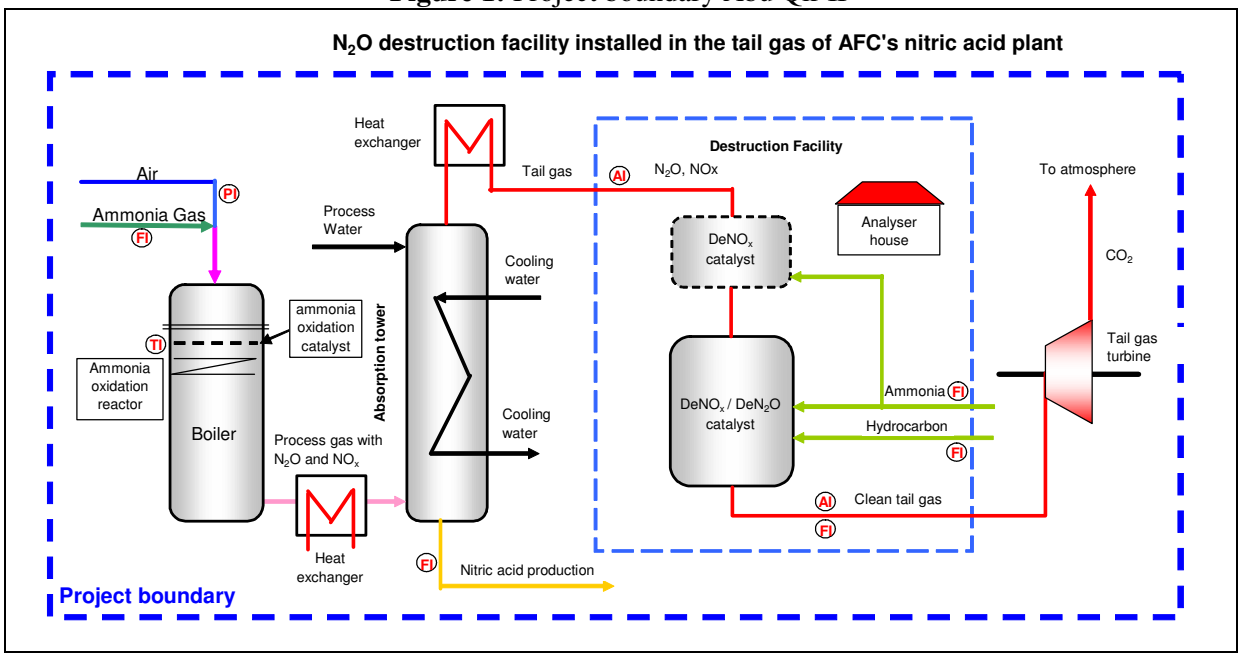
Technology employed by the project activity:
In this project, CARBON Egypt installed the EnviNO$_X$® system for catalytic reduction of NO_x and N_2O additionally to the equipment at the nitric acid manufacturing plant. The project activity reduces the GHG emissions, which would otherwise be released to the atmosphere, if the project was not implemented. The implementation of the N_2O destruction project at AFC involves that natural gas, a mixture of hydrocarbons of which the main constituent is methane (CH_4), is employed as a reducing agent for N_2O removal.

Location of the project activity:
The EnviNO$_X$® system was installed at the nitric acid plant on site of Abu Qir Fertilizer Co. S.A.E., furthermore called "AFC".

Location of the EnviNO$_X$®-System:
The EnviNO$_X$®-Reactor (21R004) is located between tail gas heater IV (21E013) and the tail gas turbine (21MT022) which is the position with the highest tail gas temperature in the nitric acid production process at AFC.

The following figure shows the spatial extend of the project boundary.

Figure 1: Project boundary Abu Qir II



At Abu Qir II nitric acid plant, the EnviNO$_X$®-Systems is installed between the tail gas heaters and the tail gas turbine. The DeNO$_x$-unit was removed.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

>>

Applied Baseline methodology:

AM0028 Version 1: "Catalytic N_2O destruction in the tail gas of Nitric Acid Plants"; submitted by Carbon Projektentwicklung GmbH.

Applied Monitoring methodology:
AM0028 Version 1: "Catalytic N_2O destruction in the tail gas of Nitric Acid Plants"; submitted by Carbon Projektentwicklung GmbH.

Project Design Document:
"Catalytic N_2O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co"
Version: 2 (b)
Date of Completion: 20/06/2006

A.6. Registration date of the project activity:

>>
07/10/2006

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

>>
Starting date of the first crediting period: 15/09/2006
End date of the first crediting period: 14/09/2013
Length of the first crediting period: 7 years (renewable)

A.8. Name of responsible person(s)/entity(ies):

>>
Responsible for completing the CDM-MR:

CARBON Egypt, Abu Qir			
Name	Maha Shehata	Fatehy Hany	Mahmoud Roshdy
Position	Project Manager	Project Manager	Project Manager
Email	Maha.Shehata@carbon-egypt.com	Fatehy.Ashour@carbon-egypt.com	Mahmoud.Roshdy@carbon-egypt.com
Phone Number	+2 03 5603995	+2 03 5603995	+2 03 5603995

Supervision:

CARBON Austria		
Name	Gerald Dunkel	Hans-Jürgen Salmhofer
Position	JI/CDM Director	Project Manager
Email	Dunkel@carbon-austria.com	salmhofer@carbon-austria.com
Phone Number	+43 2734 322 70-30	+43 2734 322 70-80

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

>>

1. **Starting date of operation of the project activity:** The operation of the projected activity started in October 2006. The project was implemented and is operated as per the registered PDD with all physical features (technology, project equipment, and monitoring and metering equipment) in place.

2. **Actual operation of the Project Activity during the covered monitoring period**

Observations at Nitric Acid plant

Table 1: Shutdown periods of Nitric Acid plant

Start		End		Description
Date	Time	Date	Time	
02/05/2010	21:00	04/05/2010	19:00	Nitric Acid plant shutdown (Gauze change)

Relevant hours of Nitric Acid plant shutdown periods have not been considered in overall calculations of Emission Reductions. The corrections made lead simply to the deletion of data sets for respective hours from the overall calculations of Emissions Reductions. This approach ensures the most conservative way to determine Emissions Reductions, concrete resulting in zero Emissions Reductions for respective hours of NA plant shutdown.

On the 03/06/2010 AFC checked the primary air pressure (PT-21353) of the AOR due to some observed disturbances, consequently the respective transmitter had zero values during the calibration check activities (3 hours) starting at 08:00 am. The nitric acid plant and the destruction facility (EnviNOx system) had normal operating conditions during the maintenance activities, which is presented in the respective documentation available for verification.

Observations at EnviNOx® system

Table 2: Observations at $EnviNO_X$® system

Start		End		Description
Date	Time	Date	Time	
18/04/2010	14:00	18/04/2010	15:00	Scheduled Loop test by ENTRAG
22/06/2010	10:00	25/06/2010	12:00	Quarterly Inspection Check by EMERSON Germany

EnviNOx® instruments loop test (18/04/2010):

On 18/04/2010 ENTRAG performed a loop test for the EnviNOx® field instruments. The main goal of this test is to check the correct function of the instruments' transmitters, instruments wiring and connectivity between the HART devices and the transmitters.

Meanwhile this check is definitely purposeful and affects positively on the EnviNOx© system, as it gives indications for incoming events and allow to be prepared for them.

The loop test service report issued by ENTRAG is submitted for verification.

Preventive Maintenance (Quarterly Inspection Check) at analyzers (22/06/2010 – 25/06/2010)
The calibration/maintenance activities (quarterly Inspection Visit) were carried out on-site by EMERSON Germany and had included (but not limited to) check and clean the filter, check the pressure regulator, check the sample handling system, check the solenoid valve, check the analyzer with internal diagnostic menus, leak test at sample system, clean sample lines with distilled water and manual calibration of the analyzer.
The phase of analyzer out of operation for maintenance lasted for a number of hours during preventive maintenance days.On 26/06/2010 Emerson checked the analyzer system as a whole without any analyzer out of operation hours.
Besides the regular inspection visit activities and as a part of enhancing the tail gas analysis process reliability, EMERSON tested the inlet and outlet tail gas sample lines by applying certified standard gas at the beginning of the sample line.

The service reports issued by EMERSON Germany are submitted for verification.

Evidence on destruction facility operational at normal efficiency
The following applied approach is fully in compliance with AM0028 vers1 and the registered Monitoring Plan for the project activity.
The destruction facility itself was operational at normal efficiency between 22/06/2010 – 26/06/2010 due to following conditions:

a) Nitric Acid plant was in normal operation for the relevant periods. This was demonstrated by the following parameters:
   i. AOR temperature: → no relevant variations
   ii. AOR pressure: → no relevant variations
   iii. Ammonia Input: → no relevant variations
   iv. Nitric acid production: → no relevant variations

b) The EnviNOx® system was in normal operation for the relevant periods and achieves normal efficiency. This was demonstrated and documented by the following parameters:
   i. No significant variations in the EnviNO$_X$® parameters (a) tail gas flow rate, (b) N_2O concentration, (c) NO_X concentration.
   ii. Ammonia input required for NO_X reduction: The EnviNO$_X$® system was supplied with the required amount of ammonia for the whole period.
   iii. Natural gas input required for high efficient N_2O reduction: The EnviNO$_X$® system was supplied with the required amount of natural gas for high efficient N_2O emission reductions for the whole period.
   iv. Temperature increase over the EnviNO$_X$® reactor: As the N_2O reduction taking place in the EnviNO$_X$® reactor is exothermic and causes a temperature rise, this temperature increase over the EnviNO$_X$® reactor provided evidence that the reactions have taken place and the EnviNO$_X$® system has reached normal performance.

c) Correlation Check: Based on the documents described above it was clearly demonstrated by correlation to the missing parameter that the nitric acid plant and the EnviNO$_X$® system have been operated under normal conditions and have reached normal efficiency. The applied approach is fully in compliance with AM0028 vers1 and the registered Monitoring Plan for the project activity.

Supporting documents and numerous additional clarifying tables and charts to underline above mentioned demonstrations were prepared and submitted for verification.

d) In order to ensure a conservative determination of emission reductions for these days recalculation is based on correlation and minimum historical efficiency of the EnviNO_X® system and guarantees a conservative determination of project emissions (underestimation of emission reductions).

e) The check of operating parameters before and after analyzer down time compared with values prior and after the analyzer was out of operation or out for maintenance clearly showed that those values are within the same range.

Corrected details sheet including above mentioned recalculations were prepared and submitted for verification.

Note: The efficiency of the EnviNO_X® system has reached again the "normal" level of about 99.4% after the calibration/maintenance activities performed by Emerson Germany and the regular calibration/maintenance activities were finished (identical performance as prior to the inspection check). This provides evidence that the EnviNO_X® system was working at "normal" efficiency during the period of quarterly maintenance activities, as the EnviNO_X® system is characterized by the stability of the catalyst performance. The manufacturer confirmed that after initial activation of the catalyst any change – if it takes place – occurs slowly and monotonically.
A supporting document by the manufacturer is submitted for verification.

Clarifications and measures undertaken for a reliable system
The quarterly Inspection Visits carried out by EMERSON Germany should not be considered as a failure of the analyzer system but a measure to ensure highest possible quality of the monitoring data through regular calibration/maintenance checks.

Service reports by ENTRAG as well as inspection visit reports by EMERSON Germany are submitted for verification.

All measuring and analytical instruments are being calibrated as defined in the approved CDM Project Design Document: "Catalytic N_2O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizers Co.", version 2 (b), 20 June 2006. The plant operator AFC has a Quality Management System (ISO 9001) where maintenance methods are incorporated. All relevant instruments like project relevant AOR instruments and EnviNO_X® instruments have been calibrated accordingly.

As Carbon Egypt works on improvements in terms of reliability, availability and maintainability of the EnviNO_X® system together with its technology and service providers continuously, a general check of the systems was ordered and finally performed during the scheduled shutdown of the Abu Qir Nitric Acid plant (03/03/2009 – 09/03/2009).The next general overhaul of the measuring system is tentatively scheduled for November 2010.
The maintenance activities included inter alia a comprehensive check of the analyzer system by EMERSON Germany and the exchange of the field instruments of the EnviNO_X® system also carried out by EMERSON Germany.
In addition to that, ENTRAG, which is the agent of EMERSON Process Management in Egypt, performed a loop test for the entire EnviNO_X® field instruments on 18/04/2010.

Table 3: Health and Inspection visits during Monitoring Period 14

Date	Action	Service provider
April 2010	Monthly health check, system diagnostic	ENTRAG
May 2010	Monthly health check, system diagnostic	ENTRAG
June 2010	Quarterly Inspection visit	EMERSON

3. **Events or situations with impact on the applicability of the methodology:** No such events or situations occurred during the covered monitoring period.

B.2. Revision of the monitoring plan

>>
The monitoring plan has not been revised.

B.3. Request for deviation applied to this monitoring period

>>
No deviation has been applied to this monitoring period.

B.4. Notification or request of approval of changes

>>
No changes from the project activity have been done.

SECTION C. Description of the monitoring system

>>

1. **Data collection procedures:**

The instruments transmitters continuously provide a 4 – 20 mA analogue signal according to range and units configured. These signals are transmitted to I/O cards (analogue input cards) and collected by the Delta V Processor. Resulting digital values are made available in the network to be further processed (e.g. in controller blocks, calculation of other variables) and stored uncompressed in the protected continuous historian server (CHS) continuously.

Following calculations, relevant for the calculation of emission reductions, are already conducted on a continuous basis and also stored as raw data in the CHS:

- Conversion of volume flows into standard conditions (based on temperature and pressure measurement)
- N_2O at the inlet and outlet of the destruction facility (QI_N2O and PE_N2O)

Modifications of the Delta V, which are protected by security levels by the supplier, are tracked by a Version Control Tool.

The reporting module of the Delta V system automatically generates aggregated daily reports (mdi-files) based on the stored raw data from the continuous historian server, including totals (flows) and averages (concentrations). Daily reports contain following kinds of data:

- Concentrations of N_2O at the inlet and outlet of the EnviNOx® systems (CI_N2O, CO_N2O)
- Volume Flows (F_TG; Q_HC)
- Amount of N_2O at the inlet and outlet of the EnviNOx® systems (QI_N2O, PE_N2O)
- Operating parameters of the nitric acid plant (T_g, P_g,)

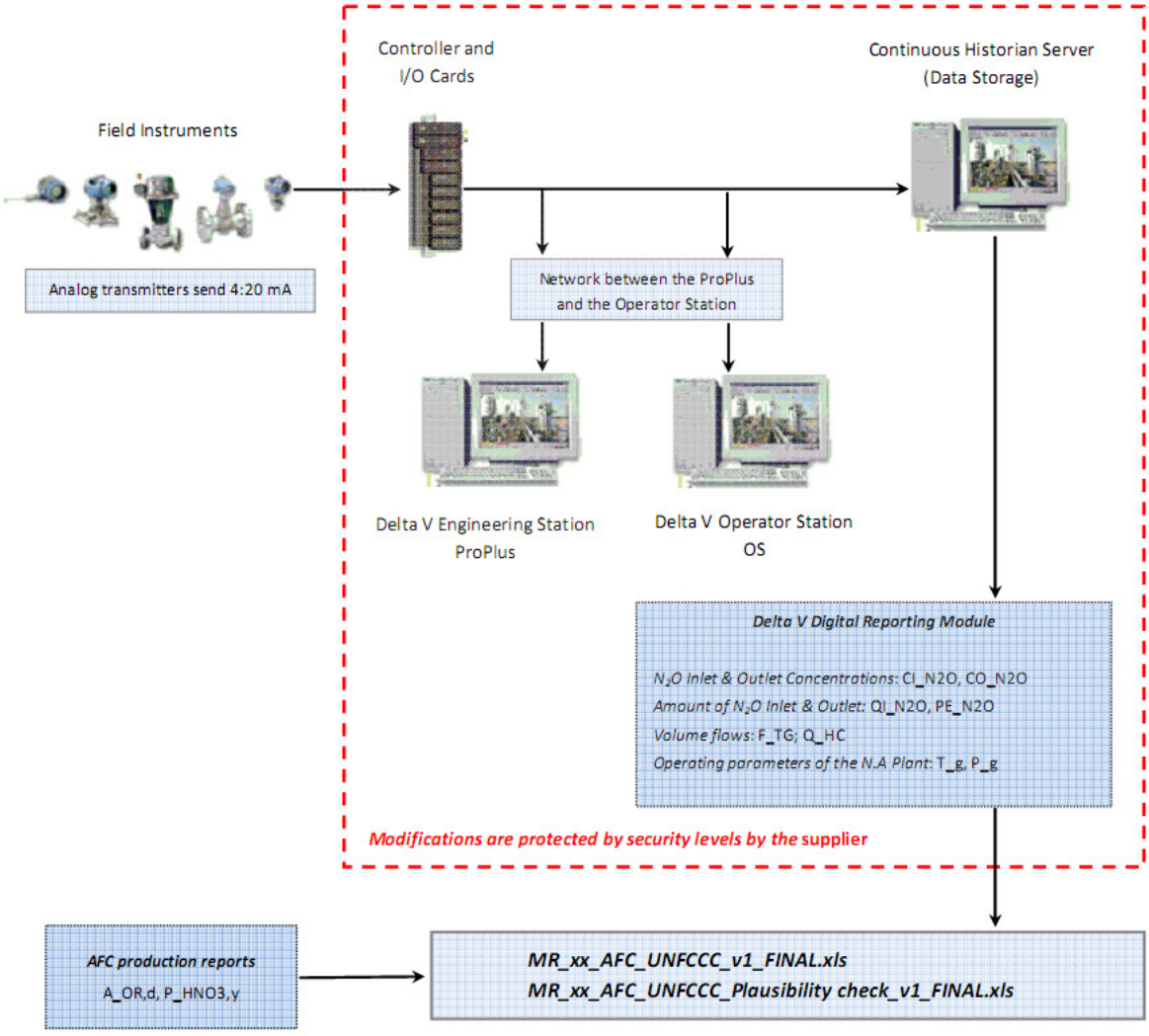
Presentation of relevant parameters & calculation of emission reductions

Relevant parameters as above (Concentrations, Volume Flows, Amounts of N_2O, Operating parameters of the nitric acid plant) are exported from the digitally available daily reports to excel sheets for presentation of required parameters and calculation of baseline emissions (BE, BE_N2O, SE_N2O), project emissions (PE, PE_ND, PE_DF, PE_HC, HCE_C, HCE_NC, OXID_HC), and emission reductions (ER) according to the formulae as required per the methodology and the PDD (The spreadsheets containing emission reductions calculations and plausibility checks are attached as *Annex 2* to this Monitoring Report).

Nitric Acid production

The data on nitric acid production and ammonia flow to the AOR is derived from AFC recordings and their respective log sheets. Details on source of data can be found directly at the respective parameter tables (A_OR,d, P_HNO3,y) in *Section D.*

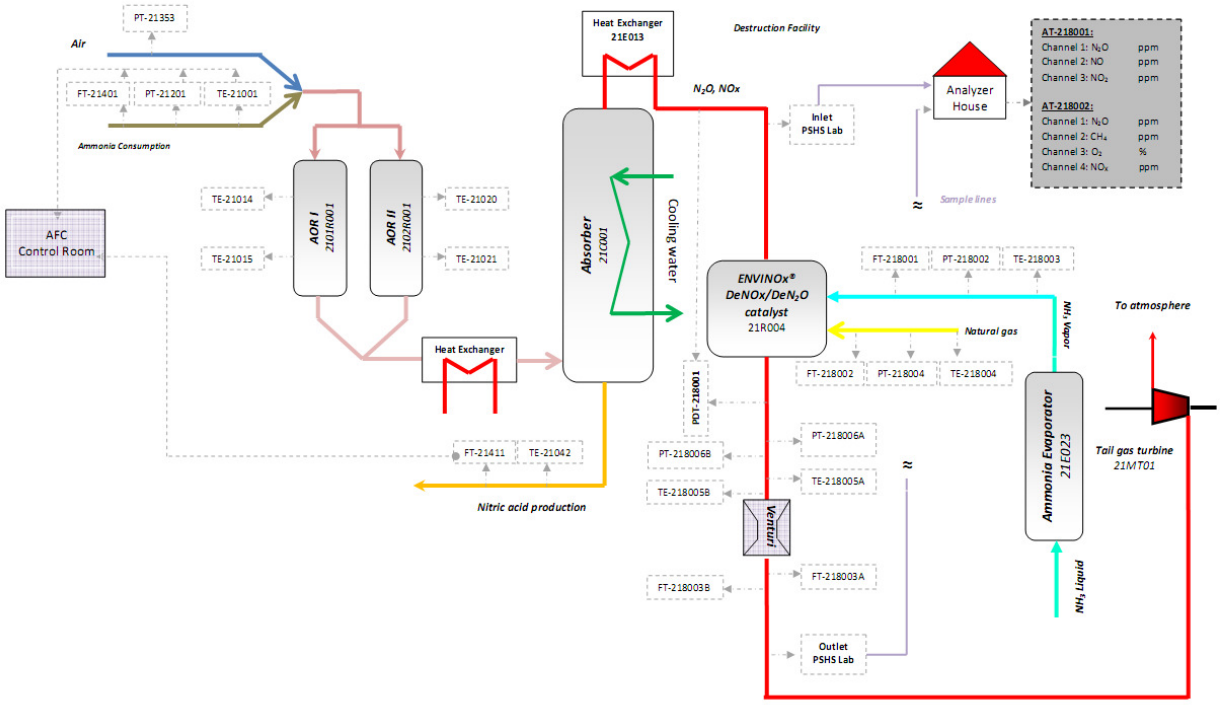
Figure 2: Information flow diagram



This approach and all implemented formulas in the Delta V system fully comply with the approved Monitoring Methodology AM0028 Version 1 "Catalytic N_2O destruction in the tail gas of Nitric Acid Plants" and the registered project documentation (Monitoring Plan and respective PDD).

Furthermore data is stored redundantly on the so called Back Up server. The system data is automatically transferred to the Back Up server and saved by Carbon Egypt on a weekly basis by burning data on CDs. The data includes raw data (XFC files, database files) as well as reporting data and Alarm & Events.

Figure 3: Line diagram showing all relevant monitoring points



2. Roles and responsibilities of personnel

Project Operator is **Abu Qir Fertilizer Co. S.A.E.** (furthermore called "AFC"), the biggest Fertilizer Company in Africa. AFC was founded as a joint stock company located and registered in the Alexandria Province under Egyptian law in 1976 and is the market leader with a market share of close to 70% of the local Egyptian fertilizer market. With closely to 3000 employees AFC is among the major job providers in Alexandria area. The company is ISO 9001/2000 and ISO 14001 certified and one of the most important companies of the Egyptian industry.
The EnviNO$_X$® system is incorporated into AFC's ISO 9001:2000 and ISO 14001:2004 standards.

The operating personnel of the EnviNO$_X$® system has been trained by the technology provider UHDE and the supplier of the digital process control system (Delta V, EMERSON process management).

Carbon Egypt is responsible for monitoring and reporting of data under the CDM Project. In terms of performing general supervision and cross-checks of monitoring and reporting data Carbon Austria supports Carbon Egypt. Carbon Austria gives their final approval on the supporting documents as well as the CDM-MR before submitting to the respective DOE for quarterly verification.

Figure 4: Organizational Chart 1: Structure onsite at Abu Qir

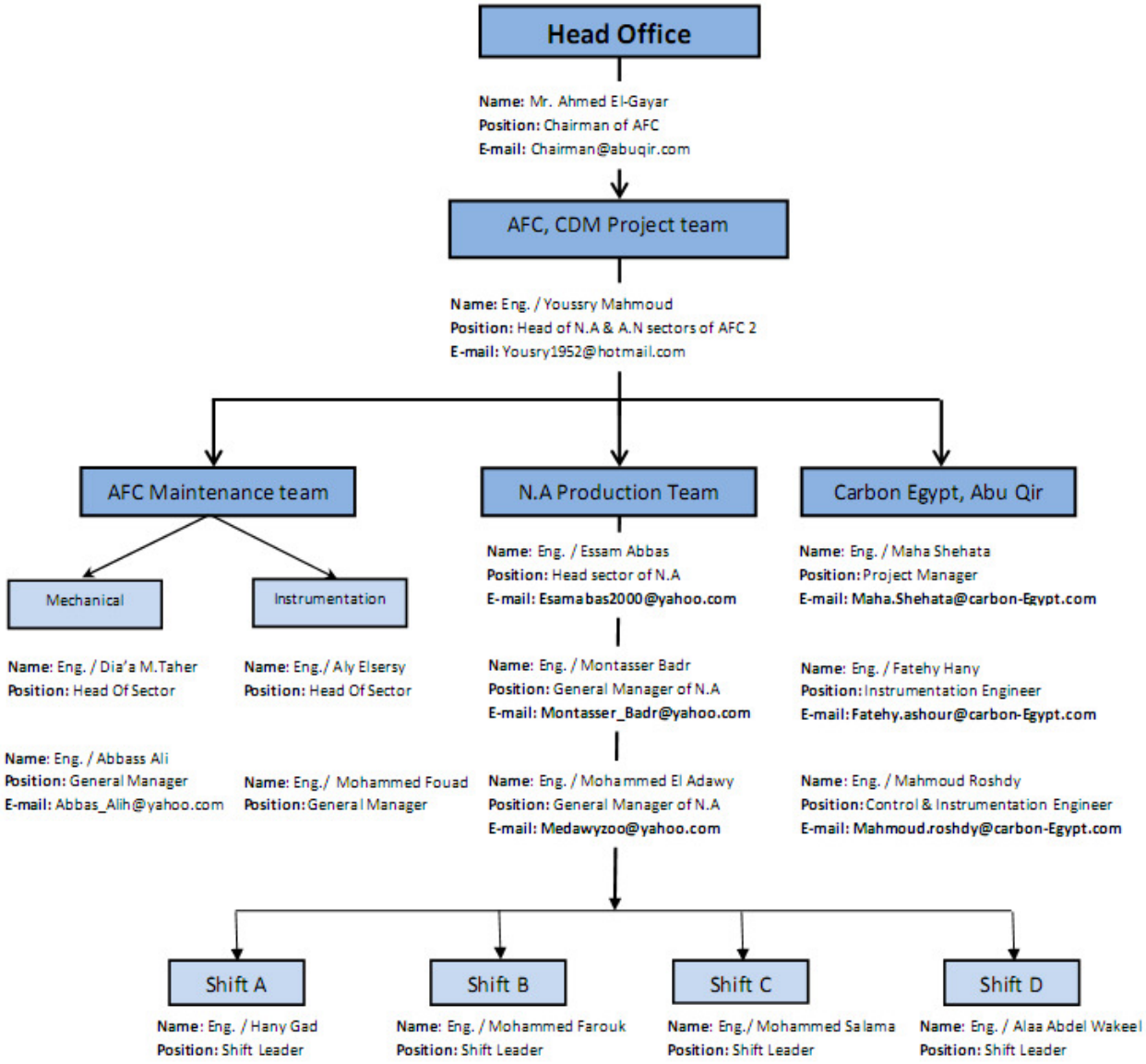
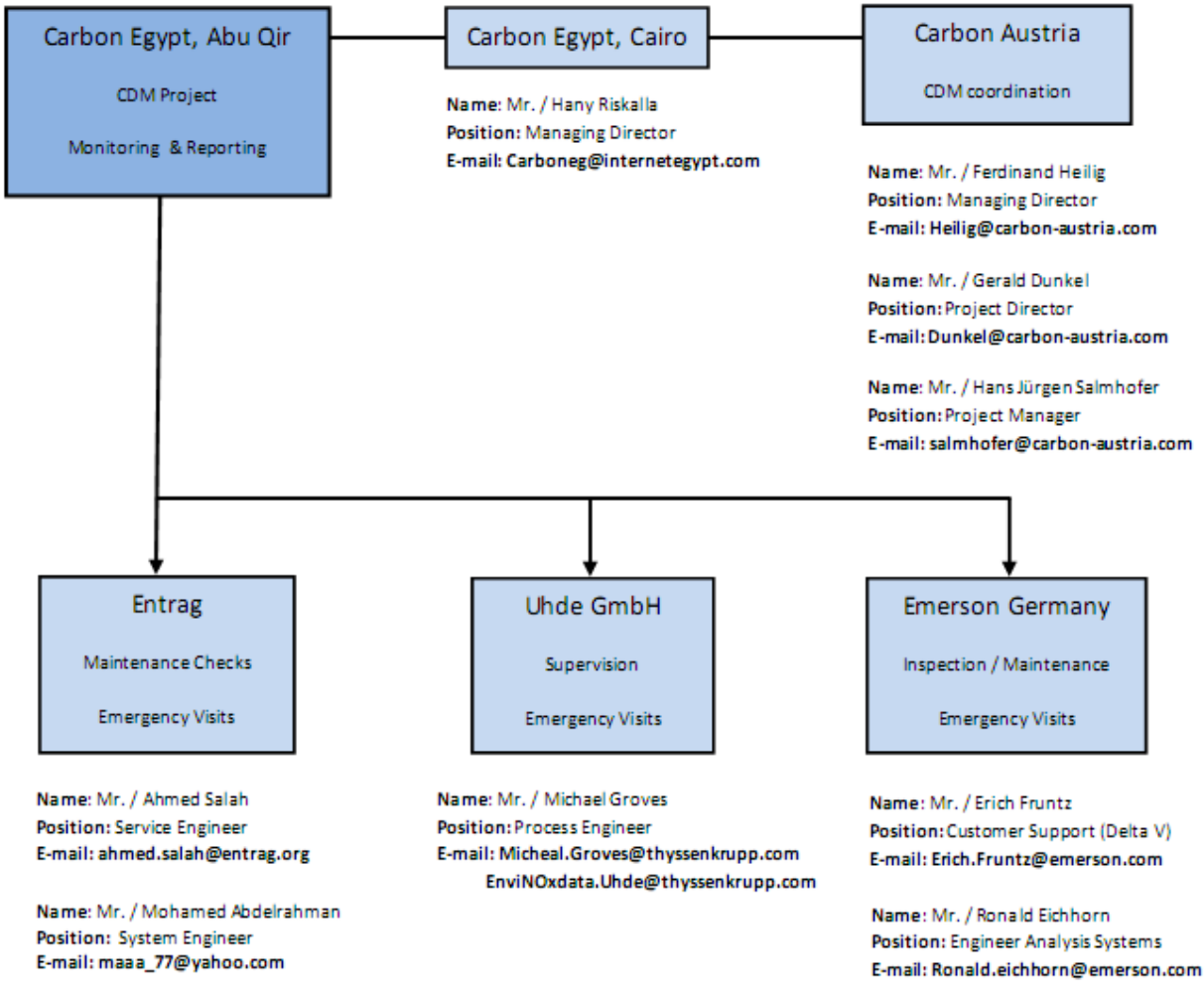


Figure 5: Organizational Chart 2: Carbon structure and technology providers



3. Back up plans / Emergency procedures for monitoring system

Back Up Plans for measuring systems / Periodically observation of the automated monitoring system

EnviNO$_X$® – automatic DCS system:

The EnviNO$_X$® system is designed for automatic operation, so that activities by the operation personnel are not required for during normal operation. However, all alarms and any action taken by the operating personnel (events) are automatically logged at the engineering and the operation station (Alarm & Event List) of the DCS system. All log sheets for **Alarm & Events** are exported and therefore digital available (Excel Files) and can easily be analysed and evaluated.

Malfunction of system components is indicated on the operator (AFC) console in the control room as an alarm. Occurrence of such an alarm requires the operator to immediately take measures to remedy

the problem. This is done by informing AFC instrument department and Carbon Egypt. It is then decided whether the problem can be fixed immediately by AFC or Carbon Egypt, or whether external support from ENTRAG / EMERSON Germany / UHDE is required (please refer also to *Figure 5* above).

Back Up – EnviNO_X® support:
In addition to the quality control and quality assurance procedures according to AFC quality management system and in order to avoid possible failures of the automated monitoring system several procedures are implemented for the project activity.
Carbon Egypt has contracted the Egyptian ENTRAG Group – the Agent for EMERSON Process Management in Egypt - to execute monthly on-site **Health Checks.** EMERSON Germany has been contracted to execute quarterly on-site **Inspection Visits**. Furthermore a **24 hours emergency service** and the **Delta V Guardian Support** are covered by the contracts.
The monthly health checks and the quarterly inspection visits are to conduct observation of the EnviNO_X® system, the monitoring equipment required for the CDM project and the automated monitoring system. The system components, measurement devices, calibration works and the automated monitoring system required for the monitoring of the CDM project are covered by the contracts. Health check reports and inspection visit reports are available.
The responsible project managers of Carbon Egypt are carrying out **on-site inspections** on a daily basis and AFC is carrying out a site check of the EnviNO_X® system once per shift.
Furthermore the AFC maintenance department is performing **weekly inspection** including an on-site check of the EnviNO_X® system.
Supervision is done based on the daily reports by the technology provider UHDE and EMERSON.

Back Up – Spare Parts on Stock On-site:
As a further important part of the back up plan to deal with events like measuring equipment out of service Carbon Egypt stocks a comprehensive range of spare part devices on-site. The spare part stock consists basically of 6-month consumables and for two year operation as recommended by the supplier. It includes inter alia filter elements, valves and pressure controllers for the sample handling system and filter elements, analysis cells (crucial part for analyzers), flow sensors and several electrical parts for the analyzers. The stock of spare parts is updated on a quarterly basis and the amount of spare parts to reorder is recommended by the supplier as well.

Back Up – Certified test gases
Pressure levels of test gases used for the regular, automatic calibration of the inlet and outlet analyzers are constantly monitored during the regular inspection by AFC. Spare bottles of test gases are purchased in proper time. Specifications of test gases are available and submitted to the DOE for verification.

Back Up – Procedures:
In addition to the quality control and quality assurance procedures according to AFC quality management system and in order to avoid possible failures of the automated monitoring system several procedures are implemented for the project activity. The approach by Carbon Egypt was to ensure immediate response to such alarms/malfunctions respectively in the system (“*Procedures for Carbon Egypt CDM Project”).*

The following table summarizes the periodically observations of the AMS.

Table 4: AMS observation overview

Organization	Action	Frequency	Output
Delta V	Events & Alarm List	Continuously	Txt-files, Excel files
AFC	Shift inspection	3 times a day	Plant Check
CARBON Egypt	Inspection	Daily	EnviNO$_X$® Journal
AFC	Inspection	Weekly	AFC Report
ENTRAG	Health check, System diagnostic	Monthly	Health Check Report on AMS and EnviNO$_X$®
EMERSON Germany	Inspection visit	Quarterly	Inspection Report on AMS and EnviNO$_X$®
EMERSON Germany	Remote diagnosis	Continuously	Diagnosis Check
UHDE	Supervision	Continuously	Plausibility Check

All resulting documents are analyzed and evaluated by Carbon Egypt. In case of any upcoming problem or failure of the EnviNO$_X$® system and/or the automated monitoring system Carbon Egypt immediately take measure to remedy the problem. The provider of the automated monitoring system is available 24 hours a day via Hotline. Furthermore ENTRAG is committed to be onsite within 24 hours.

Systematic measures for QA for monitoring data during analyzer down times

- Back Up Plans (please refer to the above)

- Check against operating parameters

  In order to ensure the quality of the monitored data during analyzer downtimes Carbon Egypt contracted EMERSON Germany and ENTRAG for regular maintenance & calibration services and applied the CDM/QA procedure according to the Project Design Document of "Catalytic N_2O Destruction Project in the Tail Gas of the Nitric Acid Plant of Abu Qir Fertilizer Co."

  The procedure how to proceed in cases of analyzer down times is a five-step approach:

  a) Nitric Acid plant in normal operation:
  If there is a down time of concentration measurements Carbon Egypt provides suitable operating parameters to demonstrate that the nitric acid plant is operating under normal conditions.
  b) EnviNOx® system in normal operation:
  Carbon Egypt provides suitable operating parameters to demonstrate that the EnviNOx® system is operating under normal conditions and has reached normal efficiency.
  c) Correlation check:
  The estimation of emission reductions is based on correlation methods, applying the parameter with the highest historical correlation to the missing parameter.
  d) Recalculation:
  In order to ensure a conservative determination of emission reductions for hours with analyzer downtimes recalculation is based on parameters with applicable historical correlation to the missing parameter (e.g. minimum historical efficiency of the EnviNOx® system; the flow of N_2O reducing agent to the reactor; the tail gas volume flow;) and consequently guarantees a conservative determination of emission reductions.
  Conservativeness is ensured inter alia by using minimum efficiency of the system or in terms of

correlation parameters taking into consideration the most conservative value between the correlation result and the values 24 hours before and after the respective event.

e) Check parameters before and after analyzer down time:
Operating parameters are compared with values prior and after the analyzer was out of operation or out for maintenance to ensure that those values are within the same range.

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
Data / Parameter:	**EF_HC**
Data unit:	**tCO_2e/t**
Description:	Hydrocarbon CO_2 emission factor
Source of data used:	According to PDD; The hydrocarbon CO_2 emission factor is given by the molecular weights and the chemical reaction when hydrocarbons are converted. In order to apply a conservative approach the HC emission factor for natural gas as reducing agent is set at 3.0 tCO_2e/t.
Value(s) :	**3.0 tCO_2e/t**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project Emission calculations
Additional comment:	

Data / Parameter:	**Type_HC**
Data unit:	**-**
Description:	Type of hydrocarbon
Source of data used:	Hydrocarbon supplier
Value(s) :	**Natural Gas**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project Emission calculations
Additional comment:	

Data / Parameter:	**Tg,hist**
Data unit:	**°C**
Description:	Historical operating temperature range of the ammonia oxidation reactor
Source of data used:	According to PDD
Value(s) :	Burner 1/2 **850 : 910 °C**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission calculations
Additional comment:	

Data / Parameter:	**Pg,hist**
Data unit:	**Pa**
Description:	Historical operating pressure range of the ammonia oxidation reactor
Source of data used:	According to PDD

Value(s) :	**2.0*10^5 Pa** to **4.5*10^5 Pa**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission calculations
Additional comment:	

Data / Parameter:	**G_sup,hist**
Data unit:	**-**
Description:	Historical supplier of the ammonia oxidation catalyst
Source of data used:	According to PDD
Value(s) :	**Umicore**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission calculations
Additional comment:	

Data / Parameter:	**G_com,hist**
Data unit:	**%**
Description:	Historical composition of the ammonia oxidation catalyst
Source of data used:	According to PDD
Value(s) :	**90% Pt** **10% Rh**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission calculations
Additional comment:	

Data / Parameter:	**A_OR,hist**
Data unit:	**tNH_3/d**
Description:	Max. historical ammonia flow rate to the ammonia oxidation reactor
Source of data used:	According to PDD
Value(s) :	**545 tNH_3/d**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission calculations
Additional comment:	

D.2. Data and parameters monitored	
Data / Parameter:	**PE_y**
Data unit:	**tCO_2e**
Description:	Project emissions
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring system (Delta V)

	Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**2,602 tCO_2e**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Annual / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**PE_ND,y**
Data unit:	**tCO_2e**
Description:	Project emissions from N_2O not destroyed
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring system (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**2,148 tCO_2e**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Annual / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**PE_DF,y**
Data unit:	**tCO_2e**

Description:	Project emissions from destruction facility
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring system (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**454 tCO_2e**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Annual / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**PE_N2O,y**
Data unit:	**tN_2O**
Description:	N_2O not destroyed by facility
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring system (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**6.9 tN_2O**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Daily
Calculation method (if applicable):	Calculated according to formulae given in PDD

QA/QC procedures applied:	-

Data / Parameter:	**F_TG,i**
Data unit:	**Nm³/h**
Description:	Volume flow tail gas at N_2O destruction facility
Measured /Calculated /Default:	Measured
Source of data:	Flow meter / Monitoring System (Delta V) Flow metering system automatically records volume flow adjusted to standard temperature and pressure. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**237,472 Nm³/h** **(507,477,485 Nm³)**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Venturi tube, designed and manufactured in accordance with ISO 5167-4:2003 Standard Normal Conditions: 1,013.25 hPa, 273.15 K) **FT 218003A/B** Type: Differential pressure transmitters Accuracy class: ± 0.075% of calibrated span Serial number: 8657986 / 8657987 Calibration frequency: 2 years Date of last calibration: 27.01.2009 Validity: 26.01.2011 **TE 218005A/B** Type: Temperature transmitters Accuracy class: ± 0.1% of calibrated span in accordance with IEC 584 Serial number: 2217901 / 2217902 Calibration frequency: 2 years Date of last calibration: 13.01.2009 Validity: 12.01.2011 **PT 218006A/B** Type: Pressure transmitters Accuracy class: ± 0.075% of calibrated span Serial number: 8657989 / 8657990 Calibration frequency: 2 years Date of last calibration: 27.01.2009 Validity: 26.01.2011
Measuring/ Reading/	Measuring: Continuously

Recording frequency:	Recording: Daily
Calculation method (if applicable):	-
QA/QC procedures applied:	The plausibility of measured values was checked with the values of the redundant instruments. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC. Please refer also to *Section C – 4. Back Up plans / Emergency procedures for monitoring system* of this Monitoring Report and respective subitems *Back Up Plans for measuring systems / Periodically observation of the automated monitoring system* and *Systematic measures for QA for monitoring data during analyzer down times*.

Data / Parameter:	**CO_N2O,i**
Data unit:	**tN_2O/ Nm^3**
Description:	N_2O concentration at destruction facility outlet
Measured /Calculated /Default:	Measured
Source of data:	Non-dispersive infrared photometry for N_2O / Monitoring System (Delta V) In the effluent of the EnviNO_X®- system, the concentration of nitrous oxide (N_2O) is analysed continuously. Analysis is done by using non-dispersive infrared photometry for N_2O. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**$1.37*10^{-8}$ tN_2O/Nm^3**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	**AT 218002** Type: NDIR Analyzer Accuracy class: $\pm$ 1% (zero/span) Serial number: 600561462896 Calibration frequency: Zero calibration daily (automatically) Span calibration every other day (automatically) Date of last calibration: Done on daily basis Validity: ok
Measuring/ Reading/ Recording frequency:	Measuring: Continuously Recording: Daily
Calculation method (if	-

applicable):	
QA/QC procedures applied:	Accuracy-safeguarding instructions from Emerson Process Management, the manufacturer of the equipment, related to regular self-calibration and quality of used standard gases, are followed. The analyzers need a calibration on a regular basis. This adjustment procedure is done automatically and can be triggered manually from the operating console or automatically on a time basis (Zero calibration: daily, span calibration: every two days). Certified (Certificates confirming stability of standard gas during monitoring period and 1% uncertainty) standard gases are used for self calibration. Sample line testing is done annually by applying certified standard gas at the beginning of the sample line. Latest test has been conducted on 24/06/2010. Entrag has been mandated to conduct monthly analyser health checks. Furthermore Emerson Germany has been mandated to conduct quarterly inspection checks to ensure good instrument condition. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC. Please refer also to *Section C – 4. Back Up plans / Emergency procedures for monitoring system* of this Monitoring Report and respective subitems *Back Up Plans for measuring systems / Periodically observation of the automated monitoring system* and *Systematic measures for QA for monitoring data during analyzer down times*.

Data / Parameter:	**M_i**
Data unit:	**h**
Description:	Measuring Interval
Measured /Calculated /Default:	Measured
Source of data:	Monitoring System (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**10 sec**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and project emission calculations
Monitoring equipment (type, accuracy class, serial	

number, calibration frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	Measuring: Continuously Recording: Daily
Calculation method (if applicable):	-
QA/QC procedures applied:	The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC. Please refer also to *Section C – 4. Back Up plans / Emergency procedures for monitoring system* of this Monitoring Report and respective subitems *Back Up Plans for measuring systems / Periodically observation of the automated monitoring system* and *Systematic measures for QA for monitoring data during analyzer down times*.

Data / Parameter:	**PE_HC,y**
Data unit:	**tCO_2e**
Description:	Emissions from hydrocarbon use in destruction facility
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring System (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**454 tCO_2e**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Annual / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**HCE_C,y**
Data unit:	**tCO_2e**
Description:	Converted hydrocarbon emissions
Measured /Calculated	Calculated

/Default:	
Source of data:	Monitoring System (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**377 tCO_2e**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Annual / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**HCE_NC,y**
Data unit:	**tCO_2e**
Description:	Non-converted methane emissions
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring System (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**77 tCO_2e**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Annual / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**Q_HC,y**
Data unit:	**Nm^3**
Description:	Hydrocarbon input (reducing agent)
Measured /Calculated /Default:	Measured
Source of data:	Flow meter / Monitoring System (Delta V) The natural gas used as reducing agent is measured by standard flow meter. Flow is converted to standard conditions based on temperature and pressure measurement. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**165,651 Nm^3**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	**FT 218002** Type: Natural gas flow meter Accuracy class: ± 1.6% in accordance with VDI/VDE 3513 Serial number: D090000000027178 Calibration frequency: 2 years Date of last calibration: 23.01.2009 Validity: 22.01.2011 **TE 218004** Type: Temperature transmitter Accuracy class: ± 0.1% of calibrated span Serial number: 2217904 Calibration frequency: 2 years Date of last calibration: 14.01.2009 Validity: 13.01.2011 **PT 218004** Type: Pressure transmitter Accuracy class: ± 0.075% of calibrated span Serial number: 8657991 Calibration frequency: 2 years Date of last calibration: 27.01.2009 Validity: 26.01.2011
Measuring/ Reading/ Recording frequency:	Recording: Daily
Calculation method (if applicable):	-
QA/QC procedures applied:	The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the

	ISO 9001:2000 and ISO 14001:2004 procedures of AFC. Please refer also to *Section C – 4. Back Up plans / Emergency procedures for monitoring system* of this Monitoring Report and respective subitems *Back Up Plans for measuring systems / Periodically observation of the automated monitoring system* and *Systematic measures for QA for monitoring data during analyzer down times*.

Data / Parameter:	**ρ_HC**
Data unit:	**t/Nm³**
Description:	Hydrocarbon density
Measured /Calculated /Default:	Measured
Source of data:	Hydrocarbon supplier
Value(s) of monitored parameter:	**$7.8*10^{-4}$ t/Nm³** Standard Normal Conditions: 1,013.25 hPa, 273.15K
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Yearly
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	**OXID_HC**
Data unit:	**%**
Description:	Hydrocarbon oxidation factor Based on continuous measurements hydrocarbon input and hydrocarbon outlet
Measured /Calculated /Default:	Measured
Source of data:	Monitoring System (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**96.9 %**
Indicate what the data are used for (Baseline/ Project/ Leakage emission	Project emission calculations

calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Please refer to monitoring equipment for **Q_HC,y** (Natural Gas Input) **and CO_N2O,i** (Outlet Analyzer which measures CH_4 at the outlet also)
Measuring/ Reading/ Recording frequency:	Measuring: Continuously Recording: Daily
Calculation method (if applicable):	-
QA/QC procedures applied:	The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC. Please refer also to *Section C – 4. Back Up plans / Emergency procedures for monitoring system* of this Monitoring Report and respective subitems *Back Up Plans for measuring systems / Periodically observation of the automated monitoring system* and *Systematic measures for QA for monitoring data during analyzer down times*.

Data / Parameter:	**BE_y**
Data unit:	tCO_2e
Description:	Baseline emissions
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring system (Delta V) Please refer also to *Section C – 1 (Information Flow)* of this Monitoring Report.
Value(s) of monitored parameter:	**374,494 tCO2e**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Annual / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**P_HNO3,y**

Data unit:	**$tHNO_3$**
Description:	Plant output of HNO_3
Measured /Calculated /Default:	Measured
Source of data:	AFC Production reports The actual nitric acid production is measured according to the installed instruments. The instrument signals are recorded in the control room and used to determine whether the nitric acid production is within the historical designed capacity. The HNO_3 production data are derived from AFC recordings which are prepared in accordance with AFC´s quality management system ISO 9001:2000. The cumulative volume in m^3 is recorded in each shift by the operator in Abu Qir's EnviNO_X®-System unit reading sheet no. 409/1/2/3A/F1 and log sheet no. 409/1/2/3 F5. The concentration of the nitric acid is analysed two times per shift and logged in reporting sheet 410/3/3/F1. The daily HNO_3 production and the daily average concentration are recorded in sheet no. 409/1/2/3 F1. The CDM relevant data on daily HNO_3 production is derived from AFC´s sheet no. 409/1/2/3 F1 prepared in accordance with AFC´s quality management system ISO 9001:2000 and transferred to an excel spreadsheet according to *"Procedures for Carbon Egypt CDM Project"* in order to present all parameters as required by AM0028 in an overall format. This spreadsheet also includes the total daily HNO_3 production. The excel sheet containing values and automatic checks will be attached as *Annex 2* to this Monitoring Report.
Value(s) of monitored parameter:	**163,528 $tHNO_3$** The accumulated nitric acid production from the beginning of the year 2010 is 329,362 $tHNO_3$. It is clearly shown that the value is lower than the limit established in the PDD: 700,800 $tHNO_3$.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial	**FT 21411** Type: Volume flow meter

Data / Parameter:	**P_HNO3_{2010}**
Data unit:	$tHNO_3$
Total Nitric Acid produced 2010	329,362 $tHNO_3$
Limit of Nitric Acid Production according to PDD	700,800 $tHNO_3$

number, calibration frequency, date of last calibration, validity)	Accuracy class: ± (1% of measured value +0.1% of full scale value) Serial number: 621296 Calibration frequency: 1 year Date of last calibration: 03.05.2010 Validity: 02.05.2011 **TE 21042** Type: Temperature Transmitter Accuracy class: ± (0.3+0.002|t|) according to DIN IEC 751 cl. A Serial number: 2-4013-00154 Calibration frequency: 1 year Date of last calibration: 03.05.2010 Validity: 02.05.2011
Measuring/ Reading/ Recording frequency:	Recording: Daily
Calculation method (if applicable):	-
QA/QC procedures applied:	In order to prove plausibility of HNO_3 production a check over the whole Monitoring Period was performed and showed plausible data for all days covered by this Monitoring Period (nitrogen mass balance). The excel sheet containing this plausibility check will be attached as *Annex 2* to this Monitoring Report. A double check by the responsible project manager from Carbon Austria is performed according to the *"Procedures for Carbon Egypt CDM Project"*. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC.

Data / Parameter:	**QI_N2O,y**
Data unit:	**tN_2O**
Description:	Quantity of N_2O at inlet of destruction facility
Measured /Calculated /Default:	Calculated
Source of data:	Monitoring System (Delta V) Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**1,208 tN_2O**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial	-

number, calibration frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	Recording: Daily
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**CI_N2O,i**
Data unit:	**tN_2O/ Nm^3**
Description:	N_2O concentration at destruction facility inlet
Measured /Calculated /Default:	Measured
Source of data:	Non-dispersive infrared photometry for N_2O / Monitoring System (Delta V) In the feed of the EnviNO_X®- system, the concentrations of nitrous oxide (N_2O), is analysed continuously. Analysis is done by using non-dispersive infrared photometry in a combined analyzer device. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**$2.37*10^{-6}$ tN_2O/Nm^3**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	**AT 218001** Type: NDIR Analyzer Accuracy class: ± 1% (zero/span) Serial number: 370561462894 Calibration frequency: Zero calibration daily (automatically) Span calibration every other day (automatically) Date of last calibration: Done on daily basis Validity: ok
Measuring/ Reading/ Recording frequency:	Measuring: Continuously Recording: Daily
Calculation method (if applicable):	-
QA/QC procedures applied:	Accuracy-safeguarding instructions from Emerson Process Management, the manufacturer of the equipment, related to regular self-calibration and quality of used standard gases, are followed. The analyzers need a calibration on a regular basis. This adjustment procedure is done automatically and can be triggered manually from the operating console or automatically on a time basis (Zero calibration: daily, span calibration: every two days).

	Certified (Certificates confirming stability of standard gas during monitoring period and 1% uncertainty) standard gases are used for self calibration. Sample line testing is done annually by applying certified standard gas at the beginning of the sample line. Latest test has been conducted on 24/06/2010. Entrag has been mandated to conduct monthly analyser health checks. Furthermore Emerson Germany has been mandated to conduct quarterly inspection checks to ensure good instrument condition. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC. Please refer also to *Section C – 4. Back Up plans / Emergency procedures for monitoring system* of this Monitoring Report and respective subitems *Back Up Plans for measuring systems / Periodically observation of the automated monitoring system* and *Systematic measures for QA for monitoring data during analyzer down times*.

Data / Parameter:	**QR_N2O,y** **RSE_N2O,y** **CR_N2O**
Data unit:	**tN_2O** **$tN_2O/tHNO_3$** **tN_2O/m^3**
Description:	National legislation Actual no regulations on N_2O emissions are in place, confirmed by the Arab Republic of Egypt, Ministry of State for Environmental Affairs.
Measured /Calculated /Default:	-
Source of data:	Regional authorities
Value(s) of monitored parameter:	Not applicable
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/	-

Recording frequency:	
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	**T_g**
Data unit:	**°C**
Description:	Actual operating temperature ammonia oxidation reactor
Measured /Calculated /Default:	Measured
Source of data:	Temperature Transmitter / Monitoring System (Delta V) The temperature in both ammonia oxidation reactors (AOR) are monitored by two thermocouples. The operating temperatures in the AORs are automatically collected by AFC´s distributed control system (DCS) and then automatically transferred to the Delta-V distributed control system (Delta-V system) serving the CDM project. Based on these two thermocouples, the Delta-V system automatically calculates and reports the average temperature. Subsequently, the Delta-V system generates daily reports including the daily average AOR temperatures. The data from the daily reports generated by the Delta-V system are transferred to an excel sheet in order to present all parameters as required by AM0028 in an overall format. This file also includes the daily average values of the ammonia oxidation temperatures and an automatic check of each daily average value in order to see if the operation has been within the permitted operating range. The excel sheet containing values and automatic checks is attached as *Annex 2* to this Monitoring Report. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	Burner 1: **875 °C** Burner 2: **894 °C** The actual average daily operating temperature in both AORs is within the permitted range for all operating days covered by this monitoring report.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	**Burner 1** **TE 21014** and **TE 21015** Type: Temperature transmitter Accuracy class: ± 1°C according to thermocouples type S Serial number: 2-1282-00002 / 2-1282-00011

	Calibration frequency: 1 year Date of last calibration: 03.05.2010 Validity: 02.05.2011 **Burner 2** **TE 21020** and **TE 21021** Type: Temperature transmitter Accuracy class: ± 1°C according to thermocouples type S Serial number: 2-1282-00010 / 2-4013-00152 Calibration frequency: 1 year Date of last calibration: 03.05.2010 Validity: 02.05.2011
Measuring/ Reading/ Recording frequency:	Recording: Continuously
Calculation method (if applicable):	-
QA/QC procedures applied:	The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC.

Data / Parameter:	**P_g**
Data unit:	**Pa**
Description:	Actual operating pressure ammonia oxidation reactor
Measured /Calculated /Default:	Measured
Source of data:	Pressure transmitter / Monitoring System (Delta V) The operating pressure representing the pressure in the ammonia oxidation reactors (AOR) is measured by a pressure transmitter in the air compressor discharge line. The operating pressure is automatically collected by the AFC´s distributed control system (DCS) and then automatically transferred to the Delta-V distributed control system (Delta-V system), serving the CDM project. Subsequently, the Delta-V system generates daily reports including the daily average AOR pressures. The data from the daily reports generated by the Delta-V system are transferred to an excel sheet in order to present all parameters as required by AM0028 in an overall format. This file also includes the daily average values of the ammonia oxidation pressure and an automatic check of each daily average value in order to see if the operation has been within the permitted operating range. The excel sheet containing values and automatic checks is attached as *Annex 2* to this Monitoring Report. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**$3.75*10^5$ Pa**

	The actual average daily operating pressure in the AORs is within the permitted ranges for all days covered by this monitoring report. On the 03/06/2010 AFC checked the primary air pressure (PT-21353) of the AOR due to some observed disturbances, consequently the respective transmitter had zero values during the calibration check activities (3 hours) starting at 08:00 am. The nitric acid plant and the destruction facility (EnviNOx system) had normal operating conditions during the maintenance activities, which is presented in the respective documentation available for verification.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	**PT 21353** Type: Pressure transmitter Accuracy class: ± 0.5% according to SAMA Standard PMC 20.1 - 1973 Serial number: 93/079220 Calibration frequency: 1 year Date of last calibration: 03.05.2010 Validity: 02.05.2011
Measuring/ Reading/ Recording frequency:	Recording: Continuously
Calculation method (if applicable):	-
QA/QC procedures applied:	The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC.

Data / Parameter:	**Reg_NOx**
Data unit:	**tNOx/m³**
Description:	National regulation on NO_x emissions
Measured /Calculated /Default:	Calculated
Source of data:	Regional authorities: Official notification by local authorities
Value(s) of monitored parameter:	**3,000 mg/m³** According to the national Environment Law number 4 of Egypt (year 1994) the NO_x emissions at nitric acid plants are limited to 3000 mg/m³ for existing nitric acid plants (AFC). Continuous measurement of the NO_X concentration at the outlet of the EnviNO_X® system reports a concentration of **2.45 mgNO_X/Nm³.** This shows that the CDM Project operation is by far in compliance of the environmental standards.
Indicate what the data are used for (Baseline/ Project/	Baseline emission calculations

Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Date of regulation
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	**G_sup**
Data unit:	**-**
Description:	Supplier of the ammonia oxidation catalyst
Measured /Calculated /Default:	-
Source of data:	Supplier according to commercial invoice
Value(s) of monitored parameter:	**Heraeus**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	**G_com**
Data unit:	**%**
Description:	Composition of the ammonia oxidation catalyst
Measured /Calculated /Default:	-
Source of data:	Composition according to catalyst supplier certificate
Value(s) of monitored parameter:	**90% Pt** **10% Rh** The composition of the ammonia oxidation catalyst is the same kind of catalyst composition already in operation prior to the start of the project activity.

	The following table summarizes the campaign information: **Installation Date** / **Closure Date** / **Gauze Type** / **Gauze Specification** 26/10/2009 / 02/05/2010 / Heraeus / 90% Platinum 10% Rhodium 04/05/2010 / - / Heraeus / 90% Platinum 10% Rhodium
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Recording: Date of changing gauze composition
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	**SE_N2O**
Data unit:	**$tN_2O/tHNO_3$**
Description:	N_2O emission rate per ton of nitric acid
Measured /Calculated /Default:	Calculated
Source of data:	AFC Production reports, Monitoring system (Delta V) The quantity of N_2O at the inlet of the destruction facility is calculated based on the concentration at the inlet and the volume flow. The actual nitric acid production is measured according to the installed instruments. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.
Value(s) of monitored parameter:	**$7.39*10^{-3}$ $tN_2O/tHNO_3$**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration	-

frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	Recording: Yearly / periodic
Calculation method (if applicable):	Calculated according to formulae given in PDD
QA/QC procedures applied:	-

Data / Parameter:	**$A_{OR,d}$**
Data unit:	**tNH_3/d**
Description:	Actual ammonia flow rate to the ammonia oxidation reactor
Measured /Calculated /Default:	Measured
Source of data:	Flow meter The actual ammonia flow to the ammonia oxidation reactor is measured with the already installed measuring devices. The cumulated ammonia flow rate to both ammonia oxidation reactors is derived from AFC recordings which are prepared in accordance with AFC´s quality management system ISO 9001:2000. The cumulative volume in Nm^3 is recorded each hour by AFC in sheet no. 409/1/2/3 F3. Daily consumption is recorded in sheet no. 409/1/2/3 F1 and the converted value in tNH_3/day is also recorded in the same sheet. The CDM relevant data on daily ammonia flow rate to the ammonia oxidation reactors is derived from AFC´s sheet no. 409/1/2/3 F1 and transferred to an excel spreadsheet according to *"Procedures for Carbon Egypt CDM Project"* in order to present all parameters as required by AM0028 in an overall format. This spreadsheet also includes the total daily ammonia inlet flow and an automatic check of each daily value in order to see if the operation has been within the permitted operating range. The excel sheet containing values and automatic checks is attached as *Annex 2* to this Monitoring Report.
Value(s) of monitored parameter:	**522 tNH_3/d** The daily ammonia input to the AORs is within the permitted ranges for all days covered by this monitoring report
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Standard Normal Conditions: 1,013.25 hPa, 273.15 K) **FT 21401** Type: Differential pressure transmitter Accuracy class: $\pm$ 0.1% according to ANSI/ISA-S51.1.-1979 Serial number: 92/028947 Calibration frequency: 1 year

	Date of last calibration: 03.05.2010 Validity: 02.05.2011 **TE 21001** Type: Temperature transmitter Accuracy class: ± (0.3+0.002|t|) according to DIN IEC 751 cl. A Serial number: 2-4013-00151 Calibration frequency: 1 year Date of last calibration: 03.05.2010 Validity: 02.05.2011 **PT 21201** Type: Pressure transmitter Accuracy class: ± 0.1% according to ANSI/ISA-S51.1.-1979 Serial number: 26/012905 Calibration frequency: 1 year Date of last calibration: 03.05.2010 Validity: 02.05.2011
Measuring/ Reading/ Recording frequency:	Recording: Continuously
Calculation method (if applicable):	-
QA/QC procedures applied:	In order to prove plausibility of ammonia flow a check over the whole Monitoring Period was performed and showed plausible data for all days covered by this Monitoring Period (nitrogen mass balance). The excel sheet containing this plausibility check will be attached as *Annex 2* to this Monitoring Report. A double check by the responsible project manager from Carbon Austria is performed according to the *"Procedures for Carbon Egypt CDM Project"*. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2000 and ISO 14001:2004 procedures of AFC.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

It has been checked that there are no Egyptian regulation in place that would limit the quantity of N_2O that can be taken into account for the calculation of baseline emissions.

Baseline emissions of the project activity are determined based on the quantity of N_2O emitted in the baseline scenario, taking national regulations, production levels and operating conditions into consideration. The quantity of N_2O is determined based on the measurement of the N_2O at the inlet of the EnviNO_X®-System, which results in a conservative estimation of baseline emissions.

Baseline emissions are given by the following equation:

BE_y = BE_N2O x GWP_N2O

where:

BE_y	Baseline emissions in year y (tCO_2e)
BE_N2O,y	Baseline emissions of N_2O in year y (tN_2O)
GWP_N2O	Global warming potential of N_2O = 310

BE_y = BE_N2O,y x GWP_N2O = [1,208.044 x 310 = 374,494 tCO_2e]

$= \sum_i^n F\_TG,i$ x CI_N2O,i x M_i x GWP_N2O =

= 374,494 tCO_2e

Baseline emissions are limited to the design capacity of the nitric acid plant. According to AM0028 the design capacity is measured in tons of nitric acid per year. The actual nitric acid production in the covered monitoring period does not exceed the design capacity.

The spreadsheets containing baseline emissions calculations are attached as *Annex 2* to this Monitoring Report.

E.2. Project emissions calculation

>>

The emissions due to the project activity are composed of (a) the emissions of not destroyed N_2O and (b) emissions from auxiliary hydrocarbons input resulting from the operation of the EnviNO_X® system. N_2O emissions not destroyed by the project activity are calculated based on the continuous measurement of the N_2O concentration in the tail gas of the EnviNO_X® system and the volume flow rate of the tail gas stream. The emissions related to the operation of the N_2O destruction facility are given by on-site emissions due to the hydrocarbons used as input to the EnviNO_X® system.

PE_y = PE_ND,y + PE_DF,y = [2,148 + 454 = 2,602 tCO_2e]

= PE_N2O,y x GWP_N2O + PE_HC,y =

$= \sum_i^n F\_TG,i$ x CO_N2O,i x M_i x GWP_N2O + HCE_C,y =

$= \sum_i^n F\_TG,i$ x CO_N2O,i x M_i x GWP_N2O + ρ_HC x Q_HC,y x EF_HC x OXID_HC/100 =

= 2,602 tCO_2e

Project emissions are limited to the design capacity of the nitric acid plant. According to AM0028 the design capacity is measured in tons of nitric acid per year. The actual nitric acid production in the covered monitoring period does not exceed the design capacity.

The spreadsheets containing project emissions calculations are attached as *Annex 2* to this Monitoring Report.

E.3. Leakage calculation

>>
As described the project activity does not result in any relevant leakage emission, therefore:

LE_y = 0

E.4. Emission reductions calculation / table

>>
In terms of the Approved Methodology (AM0028 / Version 1), the emission reduction (ER_y) by the project activity during a given period *y* is the difference between the baseline emissions (BE_y) and project emissions (PE_y), as follows:

ER_y = BE_y – PE_y – LE_y

where:

ER_y	emissions reductions of the project activity during the year *y* (tCO_2e)
BE_y	baseline emissions during the year y (tCO_2e)
PE_y	project emissions during the year y (tCO_2e)
LE_y	leakage emissions in year y (tCO_2e)

Total baseline emissions: 374,494 tCO_2e
Total project emissions: 2,602 tCO_2e
Total leakage: 0 tCO_2e
Total emission reductions: **371,891 tCO_2e** (conservatively rounded down)

Plausibility Check

In order to assess the calculation with formulas a plausibility check on a daily basis was performed. It clearly shows plausible data with variations of about **0.017%** in Emission Reductions.
Calculations with average concentrations on a daily basis compared to calculations on a continuous basis clearly show slight variations and do not represent the most accurate way to calculate Emission Reductions. The advantage of a calculation at a very early stage is that it represents the most accurate calculation possible. Calculations which are based on concentrations and volume flows are not adulterated due to big calculation intervals. Please refer also to *Section C – 1. Data collection procedures* of this Monitoring Report.

Conclusion

- Applied ER calculations on a continuous basis guarantee the most accurate approach.
- Applied approach is in full compliance with methodology AM0028 Version 1 and registered project documentation (Monitoring Plan and respective PDD).
- Plausibility Check is to prove correct and transparent application of formulas and clearly shows plausible data.

The spreadsheets containing emission reductions calculations and plausibility checks are attached as *Annex 2* to this Monitoring Report.

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**265,740 (91 days)**	**371,891 (91 days)**

E.6. Remarks on difference from estimated value in the PDD

>>

The emissions reductions in this Monitoring Period are 371,891 tonnes of CO_2 equivalents in the period from 01/04/2010 – 30/06/2010 (i.e. 91 days). The yearly expected emissions reductions according to the registered PDD is 1,065,881 tonnes of CO_2 equivalents. This corresponds to emissions reductions of 265,740 tonnes of CO_2 equivalents in 91 days and hence the observed emissions reduction is higher than expected.

The reasons are:

- An observed higher inlet N_2O concentration, approx $2.37*10^{-6}$ tN_2O/Nm^3 (average) in this Monitoring Period compared to the value of $1.88*10^{-6}$ tN_2O/Nm^3 used for calculation of ex-ante emission reductions in the PDD.
- Higher abatement efficiency of N_2O (99.41% compared to 94% as conservatively assumed in the registered PDD).

It should be noted that the ex-ante estimation of emissions reductions was generally based on conservative assumptions.

- - - - -

History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Guideline, Form **Business Function**: Issuance		

ANNEX 1

Social Fund

As described in the PDD a Social Fund was established by the project developer and the project operator. This fund contributes to the social and environmental benefit of the people living in the area of the project activity by financing projects. The contribution to the Social Fund and the activities are monitored and reported on an annual basis.

The environmental surveillance equipment, which was identified as the first Social Fund project out of this CDM project, is expected to be erected and start operation in the first half of the year 2010.

The contribution to the Social Fund in 2008 was 292,690 Euro and 467,115 Euro in 2009 and the total amount was transferred to the AFC Social Fund bank account expeditiously.

AFC and the local DNA (EEAA) commonly agreed on the funding of several below mentioned and approved projects:

- Maintenance and fortification project of the roads surrounding AFC company;
- A study with respect to the establishment of an advanced medical project for serving the inhabitants of the surrounding area of AFC company;
- Renovation of El-Simad primary school;
- Purchasing of necessary cleaning tools, masks and medicine for the adjacent hospital as well as disinfection measurements;
- Adding a central unit to the Environment Surveillance Stations in order to connect it with the national network for industrial emissions surveillance;
- Furthermore a study in collaboration with the Alexandrian Faculty of Science is considered in order to asses possibly ways of wastewater treatment at on of Abu Qir company' drains.

Due to the numerous activities of the AFC Social Fund the contribution for the upcoming years is expected to be allocated to the above projects too.

All relevant documents, bank statements and correspondence between AFC and EEAA are submitted for verification.

ANNEX 2

Excel sheets containing ER calculations

Two Excel sheets, one containing the daily monitoring parameters, automatic checks, detailed HNO_3 production data and a separate file containing the overall plausibility check are attached to this Monitoring Report as the separate files:

- *"MR_14_AFC_UNFCCC_v1_FINAL.xls*
- *"MR_14_AFC_UNFCCC_Plausibility check_v1_FINAL.xls"*