



# Verification and certification report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the verification and certification report form for CDM project activities" at the end of this form.

## VERIFICATION AND CERTIFICATION REPORT

<b>Title of the project activity</b>	Catalytic N <sub>2</sub> O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co.
<b>Reference number of the project activity</b>	UNFCCC ID: 0490
<b>Version number of the verification and certification report</b>	1.2
<b>Completion date of the verification and certification report</b>	03/07/2017
<b>Monitoring period number and duration of this monitoring period</b>	Monitoring period 31 (Monitoring period 4 of 2 <sup>nd</sup> crediting period) Duration: 11/01/2017 – 08/04/2017
<b>Version number of monitoring report to which this report applies</b>	1.1
<b>Crediting period of the project activity corresponding to this monitoring period</b>	15/09/2013 – 14/09/2020 (including both days)
<b>Project participant(s)</b>	Carbon Egypt Ltd.; RWE Power AG; CARBON Climate Protection GmbH
<b>Host Party</b>	Arab Republic of Egypt
<b>Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)</b>	Scope: 5 / Technical Area: 5.2 CDM Methodology: ACM0019 Version 2 ("N <sub>2</sub> O abatement from nitric acid production") No standardized baseline(s) applicable
<b>Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD</b>	308,331 t CO <sub>2e</sub>
<b>Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period</b>	316,893 t CO <sub>2e</sub>
<b>Name of DOE</b>	TÜV NORD CERT GmbH

<p><b>Name, position and signature of the approver of the verification and certification report</b></p>	<div data-bbox="949 219 1230 302"></div> <div data-bbox="911 324 1262 362"><p>Stefan Winter; Final Approver</p></div>
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## SECTION A. Executive summary

CARBON Climate Protection GmbH has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 31<sup>st</sup> periodic verification (which is the 4<sup>th</sup> verification of the 2<sup>nd</sup> crediting period) of the project:

*“Catalytic N<sub>2</sub>O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co.”*

with regard to the relevant requirements for CDM project activities. The verification team has reviewed the implementation of the monitoring plan in the registered CDM project.

This verification covers the period from 11/01/2017 to 08/04/2017 (including both days) of the above mentioned UNFCCC registered project activity.

### Description of the PA

Carbon Egypt has implemented a project for GHG emission reduction by catalytic N<sub>2</sub>O destruction. The project encompasses a tertiary technology for the N<sub>2</sub>O reduction in the tail gas stream of the nitric acid production plant of Abu Qir Fertilizer Co. in Abu Qir, Egypt (Abu Qir II Nitric acid plant). Nitrous oxide that is formed as a by-product of the nitric acid production is removed by an EnviNOx<sup>®</sup>-System. The system comprises one reactor with two catalyst beds where nitrogen oxides (NO<sub>x</sub>) are catalytically reduced in the first bed by using ammonia as the reducing agent and nitrous oxide (N<sub>2</sub>O) in the second bed by using natural gas as reducing agent. The reaction products from the catalytic reactions of N<sub>2</sub>O and NO<sub>x</sub> are nitrogen, water and carbon dioxide. The tail gas from the nitric acid facility is fed into the EnviNOx<sup>®</sup>-System. The stack gas volume flow rate and the nitrous oxide concentration at the outlet of the EnviNOx<sup>®</sup>-System are monitored and recorded. The natural gas used in the catalytic reduction is monitored in order to calculate the non-N<sub>2</sub>O emissions of the PA. Details of the project location are given in table A-1 below:

**Table A-1:** Project Location

No.	Project Location
Host Country	Arab Republic of Egypt
Region:	Al-Iskandariyah Province (Alexandria Province)
Project location address:	Abu Qir
Latitude:	N31.272513°
Longitude:	E30.09755°

Basic technical details of the project are summarized in table A-2.

**Table - A-2:** Technical data of the PA

Parameter	Unit	Value
Maximum annual production	t/a	700,800
Operating pressure	barg	3.83
AOR design temperature range	°C	850 – 910
Historical emission factor	kgN <sub>2</sub> O/ t HNO <sub>3</sub>	7.23

### Scope of the Verification & Verification Process

The verification of this registered project is based on the validated project design document <sup>/PDD/</sup>, the monitoring report <sup>/MR/</sup>, emission reduction calculation spread sheet <sup>/XLS/</sup>, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The verification is carried out on the basis of the following requirements, applicable for this project activity:

- Article 12 of the Kyoto Protocol <sup>/KP/</sup>,
- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1 <sup>/MA/</sup>, and subsequent decisions made by the Executive Board and COP/MOP,
- other relevant rules, including the host country legislation,
- CDM Validation and Verification Standard <sup>/VVS/</sup>,
- monitoring plan as given in the registered PDD <sup>/PDD/</sup>,
- Approved CDM Methodology <sup>/ACM19/</sup>.

The verification consisted of the following steps:

- Contract review,
- Appointment of team members and technical reviewers,
- Publication of the monitoring report,
- A desk review of the Monitoring Report <sup>/MR/</sup> submitted by the client and additional supporting documents with the use of customised verification protocol <sup>/CPM/</sup> according to the Validation and Verification Standard <sup>/VVS/</sup>,
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting,
- Resolution of corrective actions (if any),
- Final verification reporting verifying and certifying the reported ER for the “Catalytic N<sub>2</sub>O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co.” for the period in accordance with paragraph 62 of CDM modalities and procedures,
- Technical review,
- Final approval of the verification.

### Conclusion

As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated PDD.
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., ACM0019 ver. 2.
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately (except for the delay in the calibration of meters AT-218002 and FT-21492 ).
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 31<sup>st</sup> periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

GHG ER: 316,893 tCO<sub>2e</sub>

## SECTION B. Verification team, technical reviewer and approver

### B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Winter	Rainer	TÜV NORD CERT	x	x	x	x
2.	Team Member	EI	Kochaniewicz	Grzegorz	-	x	x	x	x
3.	Team Member	EI	Marei	Ramy	TÜV NORD Egypt	x	x	x	-

### B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Winter	Stefan	TÜV NORD CERT
2.	Approver	IR	Winter	Stefan	TÜV NORD CERT

Please refer to Appendix 2 below for demonstration of how the team meets the competence required for the verification.

## SECTION C. Application of materiality

### C.1. Consideration of materiality in planning the verification

In order to ensure a complete, transparent and timely execution of the verification task, the team leader has planned the complete sequence of events necessary to arrive at a substantiated final verification opinion.

Various tools have been established in order to ensure an effective verification planning.

#### Materiality Threshold

The verification is based on the materiality threshold identified in table C-1 below:

**Table C-1:** Applied Materiality Threshold

	Threshold	Related to
<input checked="" type="checkbox"/>	0.5 %	Emission reductions or removals for registered CDM project activities achieving a total emission reduction or removal equal to or more than 500,000 tonnes of carbon dioxide equivalent per year <sup>1</sup> ;
<input type="checkbox"/>	1 %	Emission reductions or removals for registered CDM project activities achieving a total emission reduction or removal of between 300,000 and 500,000 tonnes of carbon dioxide equivalent per year;
<input type="checkbox"/>	2 %	Emission reductions or removals for registered large-scale CDM project activities achieving a total emission reduction or removal of 300,000 tonnes of carbon dioxide equivalent per year or less;
<input type="checkbox"/>	5 %	Emission reductions or removals for registered small-scale CDM project activities other than registered CDM project activities covered under next category below;
<input type="checkbox"/>	10 %	Emission reductions or removals for the type of registered CDM project activities referred to in decision 3/CMP.6, paragraph 38 (referred to as microscale project activities).

#### Strategic Analysis

At the beginning of the verification the verification team leader has assessed the nature, scale and complexity of the verification tasks by carrying out a strategic analysis of all activities relevant to the PA. The team leader has collected and reviewed the information relevant to assess that the designated verification team is sufficiently competent to carry out the verification and to ensure that it is able to conduct the necessary risk analysis.

#### Risk analysis and detailed audit testing planning

For the identification and assessment of potential reporting risks and to determine the necessary detailed audit testing procedures for residual risk areas the following table is used.

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Installation of monitoring equipment	Low	Wrong installation of monitoring equipment might lead to wrong results	Check of monitoring equipment, esp. with regards to appropriateness of the location
2.	Dysfunction of installed	Medium	Dysfunction of	Check of operational data

<sup>1</sup> A year refers to a period of 12 consecutive months.

	<i>equipment</i>		<i>equipment might lead to wrong measuring results</i>	
3.	<i>Exchange of measurement equipment</i>	<i>Medium</i>	<i>Exchange of measurement equipment might lead to incorrect data processing</i>	<i>Check of serial-numbers of installed measurement equipment</i>
4.	<i>Wrong or insufficient quality assurance of monitoring equipment</i>	<i>High</i>	<i>Wrong or insufficient QA/QC might lead to incorrect monitoring results</i>	<i>Check of</i> <ul style="list-style-type: none"> <li>- calibration intervals</li> <li>- calibration certificates</li> <li>- QAL 2 report</li> <li>- QAL 3 records</li> <li>- Qualification records of involved entities and personnel</li> </ul>
5.	<i>Delayed or wrong implementation of formulae and algorithms</i>	<i>Medium</i>	<i>It has to be ensured that e.g. calibration functions are correctly implemented</i>	<i>Check of data aggregation trails, spreadsheet programming, IT Systems etc.</i>
6.	<i>Incomplete data</i>	<i>High</i>	<i>Data gaps shall be addressed in line with applicable rules</i>	<i>The completeness of data was checked in detail during the on-site visit. Further crosschecking was done to ensure data quality.</i>
7.	<i>Mistakes in data transfer</i>	<i>High</i>	<i>The likeliness of data transfer mistakes is considered low where automatic procedures are applied and high where manual aggregation is required</i>	<i>Check of</i> <ul style="list-style-type: none"> <li>- Data aggregation trails</li> <li>- IT systems</li> <li>- Spreadsheet programming</li> <li>- Data protection measures</li> <li>- responsibilities</li> </ul>
8.	<i>Wrong usage of emission factors, coefficients etc.</i>	<i>Low</i>	<i>Such factors may not be applicable for current conditions</i>	<i>Check of relevant parameters, e.g. GWP, molecular masses etc.</i>

On the basis of the risk analysis the verification has been planned under consideration and in accordance with the “Guideline of application of materiality in verifications”. A detailed audit / verification plan has been prepared and submitted to the PPs in due time before the site visit.

## C.2. Consideration of materiality in conducting the verification

Based on the verification planning the verification has been carried out. The concept of materiality has been considered. A breakdown of the chosen approaches is included in the following table.

<i>Parameter</i>	<i>Approach*</i>	<i>Errors* detected</i>	<i>Findings reference</i>	<i>Corrected</i>	<i>Remaining verification risk</i>
$P_{production,y}$	CDC	<input type="checkbox"/>			Not material
$h_y$	CDC	<input type="checkbox"/>			Not material
$V_{t,db,n}$	COM	<input checked="" type="checkbox"/>	CAR E.6.2 CAR E.7.1		Not material
$V_{i,t,db}$	COM	<input checked="" type="checkbox"/>	CAR E.7.1		Not material
$FC_{i,j,y}$	COM	<input type="checkbox"/>			Not material
$\rho_{i,y}$	CDC	<input type="checkbox"/>			Not material
$w_{C,i,y}$	CDC	<input type="checkbox"/>			Not material
<i>Aggregate</i>					<i>Materiality threshold not exceeded</i>

\*) incl. omissions and misstatements

+) Verification Approaches:

CDC: Complete data check of data including all data aggregation steps  
 NDC: Non-complete data check – omissions not material  
 SPL: Sampling approach (all data available)  
 ASP: Acceptance Sampling  
 COM: Data check at higher data aggregation levels and sampling at original data levels

The verification was basically carried out as per the verification plan. However, based on the actual situation on-site and the errors, omissions and misstatements identified during the verification minor deviations from the original plan occurred. However, due to their insignificance no major revision of the overall plan was required. Esp. there was no need for significant modification of the sampling approaches or for additional / less locations to be visited during the on-site.

## SECTION D. Means of verification

### D.1. Desk review

During the desk review all documents initially provided by the PPs and publicly available documents relevant for the verification were reviewed. According to VVS, version 9.0 the desk review involved the following tasks:

- (i) A review of the data and information presented to verify their completeness;
- (ii) A review of the monitoring plan and monitoring methodology, including applicable tools, paying particular attention to the frequency of measurements, the quality of metering equipment and calibration requirements, and the QA/QC procedures;
- (iii) An evaluation of data management and the QA/QC system.

All reviewed documents or references are listed in Appendix 3 of this report. The main documents are listed below:

- the last revision of the PDD including the monitoring plan<sup>/PDD/</sup>,
- the last revision of the validation report<sup>/VAL/</sup>,
- documentation of previous verifications<sup>/VER/</sup>
- the MR, including the claimed emission reductions for the project<sup>/MR/</sup>,
- the emission reduction calculation spreadsheet<sup>/XLS/</sup>.

Other supporting documents, such as publicly available information on the UNFCCC website and background information were also reviewed.



## D.2. On-site inspection

As most essential part of the verification exercise it is indispensable to carry out an inspection on-site. According to VVS, version 9.0 the on-site assessment involved the following tasks:

- (i) An assessment of the implementation and operation of the registered project activity as per the registered PDD;
- (ii) A review of information flows for generating, aggregating and reporting the monitoring parameters;
- (iii) Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the registered PDD;
- (iv) A cross check between information provided in the MR and data from other sources;
- (v) A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the registered PDD and the selected methodology and corresponding tools;
- (vi) A review of calculations and assumptions made in determining the GHG data and emission reductions;
- (vii) An identification of QA/QC procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

Hence, the main activities covered during the on-site visit included, but were not limited to:

Duration of on-site inspection: 03/05/2017 to 04/05/2017				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening meeting	AFC	03/05/2017	R. Winter G.Kochaniewicz Ramy Marei
2.	Check of changes with regards to operational, legal and organisational issues	AFC	03/05/2017	R. Winter G.Kochaniewicz Ramy Marei
3.	<i>Check of production site</i> <ul style="list-style-type: none"> <li>- <i>Main equipment (with focus on changes)</i></li> <li>- <i>Installed monitoring equipment</i></li> <li>- <i>Analyzer cabinet</i></li> <li>- <i>Laboratory</i></li> </ul>	AFC	03/05/2017	R. Winter G.Kochaniewicz
4.	Check of calibration records	AFC	04/05/2017	G. Kochwiewicz
5.	Check of QAL 2 and QAL 3 records	AFC	04/05/2017	R. Winter
6.	Data check including complete data aggregation, calculations and assumptions	AFC	04/05/2017	R. Winter
7.	Closing meeting	AFC	04/05/2017	R. Winter G.Kochaniewicz

## D.3. Interviews

During the on-site visit the verification team performed interviews with the PPs to confirm selected information and to resolve issues identified in the document review.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Bichler	Sonja	CARBON Climate Protection GmbH	03 + 04/05/2017 (TelCon)	Discussion of results	R. Winter, G. Kochaniewicz
2.	Dunkel-Schwarzenberger	Gerald	CARBON Climate Protection GmbH	03/05/2017	General aspects	R. Winter, G. Kochaniewicz
3.	El Adawy	Mohamed	AFC	03/05/2017	Plant operation	R. Winter, G. Kochaniewicz
4.	Bader	Montasser	AFC	03/05/2017	Plant operation	R. Winter, G. Kochaniewicz
5.	Ashour	Fatehy	CARBON Climate Protection GmbH	03 + 04/05/2017	All	R. Winter, G. Kochaniewicz
6.	Roshdy	Mahmoud	CARBON Climate Protection GmbH	03 + 04/05/2017	All	R. Winter, G. Kochaniewicz R. Marei

#### D.4. Sampling approach

##### D.4.1 Sampling during monitoring

<input checked="" type="checkbox"/>	No sampling approach has been used by the PP to determine the monitored parameters				
<input type="checkbox"/>	A sampling approach has been taken for the following monitored parameter(s):				
	Parameter	Sampling approach <sup>1)</sup>	Sampling Type <sup>2)</sup>	Population	Sample Size
	N/A				

<sup>1)</sup> Sampling Approaches:

SiRS: Simple Random Sampling  
 StRS: Stratified Random Sampling  
 SS: Systematic Sampling  
 CS: Cluster Sampling  
 MSS: Multi-stage Sampling

<sup>2)</sup> Sampling Types:

PS: Parameter Sampling

##### D.4.2 Sampling approaches during verification

<input type="checkbox"/>	No sampling approach has been used by the VT to verify the monitored parameters				
<input checked="" type="checkbox"/>	A sampling approach has been applied by the VT for the following monitored parameter(s):				
	Parameter	Sampling approach <sup>1)</sup>	Sampling Type <sup>2)</sup>	Population	Sample Size
	$V_{t,db,n}$	OS	COM	88 days	1 day
	$V_{i,t,db}$	OS	COM	88 days	1 day

1) Sampling Approaches:

SiRS:	Simple Random Sampling
StRS:	Stratified Random Sampling
SS:	Systematic Sampling
CS:	Cluster Sampling
MSS:	Multi-stage Sampling
OS:	Other Sampling

2) Sampling Types:

AS:	Acceptance Sampling
PS:	Parameter Sampling
COM:	Full data check at higher data aggregation levels and sampling at original data levels

No sampling approach has been used by the PPs to determine the ER for the current monitoring period. Hourly average values of all continuous monitored values have been made available to the verification team. The complete data aggregation has been checked without any sampling approaches. The hourly values have been derived automatically from the DeltaV System. Only in order to check the correct aggregation and transfer of data original data recordings have been checked. Due to the automatic system behind this step a procedural check has been carried out. For this purpose the original data of one day have been checked in detail. No miscalculations or any other data transfer problems have been observed.

#### D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form (E.1)	0	0	0
Compliance of the project implementation with the registered PDD (E.3)	0	0	0
Post-registration changes (E.4)	0	0	0
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline (E.5)	0	1	0
Compliance of monitoring activities with the registered monitoring plan (E.6)	0	1	0
Compliance with the calibration frequency requirements for measuring instruments (E.7)	0	1	0
Assessment of data and calculation of emission reductions or net removals (E.8)	0	0	0
Others	1	0	0
<b>Total</b>	<b>1</b>	<b>3</b>	<b>0</b>

All findings were satisfactorily addressed by the PPs. For a detailed list of all CARs, CLs and FARs raised in the course of the verification, please refer to Appendix 4.

## SECTION E. Verification findings

### E.1. Compliance of the monitoring report with the monitoring report form

<b>Means of verification</b>	<p>A draft MR was submitted to the verification team by the PPs. The DOE has made this report publicly available prior to the start of the verification activities. No comments were received.</p> <p>By means of the UNFCCC website it has been checked whether the latest applicable MR template CDM-MR-FORM has been used.</p> <p>Further it has been checked whether the latest instructions for filling out the MR</p>
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		template have been followed. Every section has been checked against the respective guidance. The following sources of information have been used in this context: <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /MRT/</li> <li>• /unfccc/</li> </ul>
<b>Findings</b>	<input checked="" type="checkbox"/>	The latest reporting template CDM-MR-FORM (version 05.1) as listed on the UNFCCC website has been used for the Monitoring Report to be uploaded.
	<input checked="" type="checkbox"/>	The latest instructions for filling out the MR have been followed. No adverse finding has been identified in the course of this verification.
	<input type="checkbox"/>	The respective requirements have widely been complied with; however; the following issues needed to be addressed in this context: - N/A
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs have been raised in this context. No correction was required in the context. The verification team confirms that the project is in line with the respective requirements.
	<input type="checkbox"/>	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The verification team confirms that the monitoring report is complete and transparent and in accordance with the latest reporting template, the registered PDD and other relevant requirements.

**E.2. Remaining forward action requests from validation and/or previous verification**

During the validation the validating DOE might have raised issues that could not be closed or resolved during the validation stage. For this purpose FARs might have been raised. Likewise FARs might have been raised in the course of previous verifications. In the course of this verification the latest version of the PDD<sup>/PDD/</sup> and the previous verification report<sup>/VER/</sup>, where applicable, have been checked in order to identify any remaining forward action requests. For the current monitoring period the following applies:

**(i) Open issues from validation:**

<input checked="" type="checkbox"/>	There were no open issues which have been addressed in the latest version of the validation report.
<input type="checkbox"/>	All open issues from the validation have been appropriately addressed in the context of previous verifications.
<input type="checkbox"/>	All issues related to the validation have been appropriately addressed in the course of the current monitoring period (for details please refer to appendix 4)
<input type="checkbox"/>	The following issues related to the validation have <b>not</b> yet been appropriately addressed (for details please refer to appendix 4): - N/A

**(ii) Open issues from previous verifications:**

<input type="checkbox"/>	N/A – as this is the first monitoring period for this CDM PA.
<input checked="" type="checkbox"/>	There were no open issues which have been addressed in the previous verification report
<input type="checkbox"/>	All issues related to the previous verification have been appropriately addressed in the course of the current monitoring period (for details please refer to appendix 4)
<input type="checkbox"/>	The following issues related to the previous verification have <b>not</b> yet been appropriately addressed (for details please refer to appendix 4): - N/A

### E.3. Compliance of the project implementation with the registered project design document

<b>Means of verification</b>	<p>By means of an in-depth review of the PDD in its latest version – as downloaded from the UNFCCC project site – and the checks carried out during the on-site visit an assessment in accordance with applicable verification requirements has been carried out whether the project has been implemented and operated in line with the latest approved version of the PDD and whether all physical features of the project are in place. The following has been checked: implemented technology, project equipment as well as monitoring and metering equipment.</p> <p>Further it has been checked if relevant technical equipment of the PA has been exchanged or modified during the monitoring period and consistent notations of key equipment (meters etc.) in PDD, MR and calculation spreadsheet are applied.</p> <p>Furthermore, special events such as NA plant shutdowns and other out of operation times of the plant have been checked.</p> <p>Interviews with responsible personnel have been carried out, QMS records, maintenance records, instrument specifications were checked in this context.</p> <p>Special focus has further been laid to determine whether a potential phase wise implementation has occurred within the crediting period or any delays with respect to the starting dates have occurred.</p> <p>Further it has been checked whether any observed deviations from the registered project design have been correctly addressed as described in the PRC.</p> <p>The following sources of information have been used in this context:</p> <ul style="list-style-type: none"> <li>• /PDD/</li> <li>• /MR/</li> <li>• /VVS/</li> <li>• /XLS/</li> <li>• /QMS/</li> <li>• /MTR/</li> <li>• /unfccc/</li> </ul>	
<b>Findings</b>	<input checked="" type="checkbox"/>	<p>The project has been implemented and is operated as described in the latest version of the PDD as well as in section B.1 of the monitoring report. No deviations thereof have been identified in the course of this verification.</p>
	<input type="checkbox"/>	<p>The following deviations from the registered / approved project design and or the project description in the MR have been identified in the course of this verification (for further details please refer to section E.4):</p> <p>- N/A</p>
	<input type="checkbox"/>	<p>In this context the following CARs, CLs have been raised:</p> <p>- N/A</p>
	<p><i>In case of phased implementation:</i></p>	
	<input checked="" type="checkbox"/>	<p>N/A</p>
	<input type="checkbox"/>	<p>The phased implementation has correctly and in sufficient detail been described in the latest version of the PDD.</p>
	<input type="checkbox"/>	<p>The description in section 3.1 of the MR differs in content or the level of detail from the latest version of the PDD. However, the description in the MR is correct and reflects the situation during the site inspection.</p>
	<input type="checkbox"/>	<p>The project description in the PDD/MR is not deemed sufficient. The detailed implementation timeline is as follows:</p> <p>N/A</p>
<b>Conclusion</b>	<input checked="" type="checkbox"/>	<p>No CARs/CLs have been raised in this context. No correction was required in the context. The verification team confirms that the project is in line with the respective requirements.</p>

	<input type="checkbox"/>	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The project is fully implemented and has been in operation since October 2006. Further the DOE has checked the plant shutdowns against onsite inspected raw data as well as interviews with operational personnel.	

**E.4. Post-registration changes**

- ☒ By means of site visit, document check and interview it could be verified that the project is implemented and operated in line with the registered PDD and the applied methodology.
- ☒ Post registration changes have been identified and are assessed in detail in the subsequent steps E.4.1 to E.4.7.

**E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline**

It has been checked whether Temporary deviations from the registered monitoring plan (TDfrMP) or Temporary deviations from monitoring methodology or standardized baseline (TDfMM) have been applied during this monitoring period. The result is summarized in the table below.

<input type="checkbox"/>	No Temporary deviations from the registered monitoring plan (TDfrMP) or Temporary deviations from monitoring methodology or standardized baseline (TDfMM) have been submitted to the UNFCCC prior to the current monitoring period.		
<input checked="" type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC		
	1	Title	Technical adaption of monitoring equipment after renewal of crediting period
		Status	<input type="checkbox"/> under approval; <input checked="" type="checkbox"/> approved (approval No.: PRC-0490-001)
		Appr.date	19/08/2014
		Ref. No.	PRC-0490-001
	2	Title	-
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved (approval No.: )
		Appr.date	-
		Ref.No.	-
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
<input type="checkbox"/>	An approval of the following TDfrMP or TDfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC.		
	1	Issue:	-
	2	Issue:	-
<input type="checkbox"/>	The following TDfrMP or TDfMM for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	
	2	Issue:	-

**E.4.2. Corrections**

It has been checked whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this MR. The result is summarized in the table below.

<input checked="" type="checkbox"/>	During the verification of the current MP no need for corrections has been identified.	
<input type="checkbox"/>	The following corrections have been applied:	
1	Issue:	-
2	Issue:	-
	The PDD has been revised accordingly: (New) version No.: Revision date:	
	It is confirmed that the updated / corrected information is an accurate reflection of the actual project information and that the corrected parameters are in accordance with the applied methodology and the monitoring plan.	
	<input type="checkbox"/> A related PRC has been submitted prior to the issuance request. The approval has been received on DD/MM/YYYY via approval number PRC-XXXX-00Z. <input type="checkbox"/> A related PRC is submitted along with this issuance request. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC.	

**E.4.3. Changes to the start date of the crediting period**

<input checked="" type="checkbox"/>	N/A - as this is not the first verification within the crediting period
<input type="checkbox"/>	The PPs do not intend to change the start date of the crediting period.
<input type="checkbox"/>	As the change in the start date was below the related time period as indicated in PS § 277 and § 278 no prior approval was required but only a notification. This notification has been submitted by the PP without involvement of the DOE. The change and new start date has been checked from the related UNFCCC project webpage.
<input type="checkbox"/>	The PPs intend to change the start date of the crediting period. As the intended change in start date beyond the related time period as indicated in PS § 279 prior approval by the Board is required. For detailed assessment of the change please refer to related PRC validation report. As per assessment in this report the DOE confirms that the change to the start date of the crediting period are in line with the related requirements of the VVS and PS.
<input type="checkbox"/>	The approval to change the start date of the crediting period has been received on DD/MM/YYYY via approval number PRC-XXXX-00Z

**E.4.4. Inclusion of a monitoring plan to a registered project activity**

<input checked="" type="checkbox"/>	N/A - as this monitoring plan was part of the registered PDD
<input type="checkbox"/>	In line with PS § 281 or § 282 the PP has forwarded a monitoring plan to the DOE for validation. No prior approval of the monitoring plan was required as the PP in line with PS § 282 wished to submit the monitoring plan together with the request for issuance for the first monitoring period. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC..
<input type="checkbox"/>	In line with § 282 the PP submitted a monitoring plan prior to the submission of the request for

	issuance for validation to the DOE. A DOE has assessed the monitoring plan in line with related VVS requirements and submitted a related PRC report for prior approval. The approval has been received on DD/MM/YYYY via approval number PRC-XXXX-00Z.
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#### E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

It has been checked whether any permanent changes from the registered monitoring plan (PCfrMP) or applied methodologies (PCfMM) including standardized baselines (PCfSB) have been approved prior or during this monitoring period or submitted with this MR. The result is summarized in the table below.

<input checked="" type="checkbox"/>	No PCfrMP, PCfMM or PCfSB have been submitted to the UNFCCC prior to the current monitoring period		
<input type="checkbox"/>	The following PCfrMP, PCfMM or PCfSB have been approved or are under approval by the UNFCCC		
	1	Title	-
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved
		Appr.date	
		Ref. No.	
	2	Title	
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved
		Appr.date	
		Ref.No.	
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a PCfrMP, PCfMM or PCfSB has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
<input type="checkbox"/>	An approval of the following PCfrMP, PCfMM or PCfSB is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.		
	1	Issue:	
	2	Issue:	
<input type="checkbox"/>	The following PCfrMP, PCfMM or PCfSB for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	
	2	Issue:	

#### E.4.6. Changes to the project design of a registered project activity

It has been checked whether any changes to the project design (CoPD) have been approved prior or during this monitoring period or submitted with this MR. The result is summarized in the table below.

<input checked="" type="checkbox"/>	No CoPD has been submitted to the UNFCCC prior to the current monitoring period		
<input type="checkbox"/>	The following CoPD have been approved or are under approval by the UNFCCC		
	1	Title	-
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved



		Appr.date	
		Ref. No.	
	2	Title	-
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved
		Appr.date	
		Ref.No.	
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
<input type="checkbox"/>	An approval of the following CoPD is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.		
	1	Issue:	-
	2	Issue:	-
<input type="checkbox"/>	The following CoPD for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	-
	2	Issue:	-

**E.4.7. Types of changes specific to afforestation and reforestation project activities**

<input type="checkbox"/>	N/A - as this monitoring plan was part of the registered PDD
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**E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline**

<b>Means of verification</b>	By means of comparison of the MR with (i) the applied CDM methodology (ii) all applicable CDM methodological tools and (iii) if applicable, a standardized baseline the verification team has checked whether the MP is in compliance with the MP related requirements of the applied methodology/tools/SB. The following sources of information have been used in this context: <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /METH/</li> <li>• /TOOL/</li> <li>• /unfccc/</li> </ul>			
<b>Findings</b>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD) and approved PRC.		
	<input checked="" type="checkbox"/>	The breakdown of MP accordance of the referenced tools is as follows:		
		1	Title (of the tool)	Tool to calculate project or leakage CO2 emissions from fossil fuel combustion
			Version	02
			MP compliance	<input checked="" type="checkbox"/> full compliance <input type="checkbox"/> findings have been raised <input type="checkbox"/> N/A (for MP)
		2	Title (of the tool)	Tool to determine the mass flow of a greenhouse gas in a gaseous stream
Version	02.0.0			
	MP compliance	<input type="checkbox"/> full compliance		

			<input checked="" type="checkbox"/> findings have been raised <input type="checkbox"/> N/A	
	<input type="checkbox"/>	The breakdown of MP accordance of the applicable SB is as follows:		
		1	Title (of the SB)	N/A
			Version	
			MP compliance	
<input checked="" type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: CAR E.5.2: <i>The monitoring plan has been registered using version 2 of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" whereas the MR refers to version 3 of this tool.</i>			
<b>Conclusion</b>	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.		
	<input checked="" type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.		
	The MR now references the valid version at the time of RfRCP.			

## E.6. Compliance of monitoring activities with the registered monitoring plan

### E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

<b>Means of verification</b>	<p>By means of comparison of the MR and the ER calculation with the latest version of the registered PDD the verification team has checked whether all parameters fixed ex-ante or at renewal of the crediting period have been applied correctly.</p> <p>The values of these parameters as listed in chapter B.6.2 of the PDD are:</p> <ul style="list-style-type: none"> <li>Operating pressure of the ammonia burner: 383 kPa</li> <li>Historical baseline emission factor of the nitric acid plant (<math>EF_{\text{historical}}</math>): 7.23 kg <math>N_2O</math>/t <math>HNO_3</math></li> <li>Default emission factor according to the operating pressure of the ammonia burner in year y (related to 100 per cent pure acid) (<math>EF_{\text{default,y}}</math>): 7.6 kg <math>N_2O</math>/t <math>HNO_3</math></li> <li>Baseline <math>N_2O</math> emission factor for nitric acid production in year y (related to 100 per cent pure acid) (<math>EF_{\text{new,y}}</math>): 3 kg <math>N_2O</math>/t <math>HNO_3</math></li> <li>Design capacity of nitric acid production during the first crediting period (<math>P_{\text{product,max}}</math>): 700,800 t <math>HNO_3</math>/a</li> <li>Global warming potential of <math>N_2O</math> valid for the commitment period (<math>GWP_{N_2O}</math>): 298</li> <li>Universal ideal gases constant (<math>R_u</math>): 8,314 Pa <math>m^3</math>/kmol K</li> <li>Molecular mass of greenhouse gas i (<math>MM_i</math>): 44.02 kg/kmol (<math>N_2O</math>)</li> <li>Total pressure at normal conditions (<math>P_n</math>): 101,325 Pa</li> <li>Temperature at normal conditions (<math>T_n</math>): 273.15 K</li> </ul> <p>Further it has been checked whether the <math>GWP_{N_2O}</math> for the respective period has been correctly applied.</p> <p>The following sources of information have been used in this context:</p> <ul style="list-style-type: none"> <li>/MR/</li> <li>/XLS/</li> <li>/PDD/</li> <li>/PS/</li> <li>/VVS/</li> <li>/unfccc/</li> </ul>
<b>Findings</b>	<input checked="" type="checkbox"/> The MR and the ER calculation have considered the parameters fixed ex-ante or at the renewal of the crediting period correctly, no deviations have been observed.

<b>Conclusion</b>	<input type="checkbox"/>	The following deviations from the parameters fixed ex-ante or at renewal of crediting period have been identified in the course of this verification: - N/A
	<input type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - N/A
	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
No further comments.		

### E.6.2. Data and parameters monitored

<b>Means of verification</b>	<p>During the verification all relevant monitoring parameters (as listed in chapter B.7.1 of the PDD) have been verified with regard to the</p> <ul style="list-style-type: none"> <li>(i) appropriateness of the applied measurement / determination method,</li> <li>(ii) the correctness of the values applied for ER calculation,</li> <li>(iii) the accuracy and applied QA/QC measures.</li> </ul> <p>The results as well as the verification procedure are described parameter-wise in the project specific verification checklist (Appendix 5).</p>	
<b>Findings</b>	<input type="checkbox"/>	Based on the details listed in appendix 5 the verification team can confirm that all parameters have been monitored according to all applicable standards and relevant requirements.
	<input type="checkbox"/>	The following deviations from monitoring requirements have been identified in the course of this verification: N/A.
	<input checked="" type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: CAR E.6.3 CAR E.7.1
<b>Conclusion</b>	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input checked="" type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
<p>After closing all raised findings it can be confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements as per the registered and approved PDD and its monitoring plan, approved methodology as well as the applied tools.</p> <p>Quality Management procedures for measurement, collection and compilation of data, data storage and archiving have been defined and were assessed to be appropriate for the purpose. No significant deviations thereof have been observed during the verification.</p>		

### E.6.3. Implementation of sampling plan

<b>Means of verification</b>	<p>The verification team has been checked whether the PPs have applied a sampling approach to determine the monitored values.</p> <p>Further it has been checked whether the PPs have correctly applied the</p>
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	implemented sampling plan including (i) description of the implemented sampling design, (ii) collected data, (iii) analysis of collected data, (iv) demonstration on whether the required confidence/precision has been met. The following sources of information have been used in this context: <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /XLS/</li> <li>• /PDD/.</li> </ul>			
<b>Findings</b>	<input checked="" type="checkbox"/>	The PPs have not applied sampling approaches for the parameters monitored.		
	<input type="checkbox"/>	The PPs have applied sampling approaches for the following parameters monitored.		
		1	Parameter:	
			Name:	
			Description on how the sampling efforts and survey comply with the validated sampling plan:	
	2	Parameter:		
		Name:		
		Description on how the sampling efforts and survey comply with the validated sampling plan:		
	<input type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - N/A		
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.		
	<input type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.		
	No further comments.			

### E.7. Compliance with the calibration frequency requirements for measuring instruments

<b>Means of verification</b>	During the verification the relevant monitoring equipment has been checked whether the calibration requirements have been met; especially if the calibration frequency is in line with the requirements of the validated and registered PDD, with EN 14181 and/or the applicable calibration standards. The results as well as the verification procedures are described equipment-wise in the project specific verification checklist (Appendix 6). The following sources of information have been used in this context: <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /XLS/</li> <li>• /CAL/.</li> </ul>		
<b>Findings</b>	<input type="checkbox"/>	Based on the details listed in appendix 6 the verification team can confirm that all installed monitoring equipment physically exist (identification by TAG numbers and serial numbers) and has been duly calibrated for this entire monitoring period. No delay of calibration has been observed.	

	<input checked="" type="checkbox"/>	<p>The following deviations from calibration frequency requirements have been identified in the course of this verification:</p> <p>As per applicable EN 14181 requirements the meters AT-218002 and FT-21492 have to undergo an annual surveillance test. However, during the current MP this AST was delayed.</p> <p>The PP has addressed the delayed calibration in the MR and the ER calculation by applying substitute values for the affected monitoring parameters.</p>
	<input checked="" type="checkbox"/>	<p>In this context the following CARs, CLs, FARs have been raised: CAR E.7.1: <i>The expanded uncertainty, as determined during QAL2, should be used as uncertainty to calculate the substitute values during the period of delayed calibration.</i></p>
<b>Conclusion</b>	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input checked="" type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The expanded uncertainty has been considered to determine the substitute values for the respective parameters during the times of delayed calibration.

## E.8. Assessment of data and calculation of emission reductions or net removals

### E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

<b>Means of verification</b>	<p>During the verification the calculation of baseline GHG emissions has been checked. In detail the following has been verified:</p> <ul style="list-style-type: none"> <li>• <i>Transparency</i>: It has been checked whether the calculation of baseline emissions is fully traceable and the Excel calculation spreadsheet provides all calculation formulae.</li> <li>• <i>Parameter consistency</i>: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the MR and the Excel calculation spreadsheet. Besides the information provided in MR and/or Excel spreadsheet has been crosschecked with other sources such as plant logbooks, inventories, lab analysis, invoices.</li> <li>• <i>Correctness</i>: It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology. Further it has been checked whether any assumptions used have been justified.</li> <li>• <i>Completeness</i>: It has been checked whether all calculations are complete and without omissions as well as whether a complete set of data is available.</li> </ul> <p>The following sources of information have been used in this context:</p> <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /XLS/.</li> </ul>
<b>Findings</b>	<p>The baseline GHG emissions achieved in this monitoring period have been calculated to be 361,297 tCO<sub>2</sub>e.</p>
	<p><input checked="" type="checkbox"/> The calculation of the baseline emissions was found to be fully compliant with the above stated principles.</p> <p>It was found that a complete set of data covering the monitoring period has been provided by the PPs. Activity levels and non-activity parameters have been monitored in accordance with the monitoring plan, as applicable.</p> <p>The calculations of baseline GHG emissions or baseline net GHG removals have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied SB. Any assumptions</p>

		used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified.
	<input type="checkbox"/>	The verification team has identified mistakes in the baseline emissions calculation or the underlying calculation approaches
	<input type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - N/A
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The baseline emissions calculation was prepared by the PPs and presented to the verification team. It can be confirmed that the baseline calculation is overall correct.	

### E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

<b>Means of verification</b>	<p>During the verification the calculation of project GHG emissions has been checked. In detail the following has been verified:</p> <ul style="list-style-type: none"> <li>• <i>Transparency</i>: It has been checked whether the calculation of project emissions is fully traceable and, where used, the Excel calculation spreadsheet provides all calculation formulae.</li> <li>• <i>Parameter consistency</i>: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the MR and the Excel calculation spreadsheet. Besides the information provided in MR and/or Excel spreadsheet has been crosschecked with other sources such as plant logbooks, inventories, lab analysis, invoices.</li> <li>• <i>Correctness</i>: It has been checked whether the applied formulae and methods for calculating project emissions are in accordance with the monitoring plan and the approved methodology. Further it has been checked whether any assumptions used have been justified.</li> <li>• <i>Completeness</i>: It has been checked whether all calculations are complete and without omissions as well as whether a complete set of data is available.</li> </ul> <p>The following sources of information have been used in this context:</p> <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /XLS/.</li> </ul>	
<b>Findings</b>	The project GHG emissions achieved in this monitoring period have been found to be 44,403 tCO <sub>2</sub> e.	
	<input type="checkbox"/>	<p>The calculation of the project emissions was found to be fully compliant with the above stated principles.</p> <p>It was found that a complete set of data covering the monitoring period has been provided by the PPs. Activity levels and non-activity parameters have been monitored in accordance with the monitoring plan, as applicable.</p> <p>The calculations of project GHG emissions or actual net GHG removals have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied SB. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied.</p> <p>No errors, miscalculations, omissions, misstatements or incomplete information have been identified.</p>

<b>Conclusion</b>	<input checked="" type="checkbox"/>	The verification team has identified mistakes in the project emissions calculation or the underlying calculation approaches.
	<input checked="" type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: CAR E.7.1
	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input checked="" type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
Where corrections were required a revised calculation of project emissions was prepared by the PPs and presented to the verification team. All raised issues were addressed appropriately so that it can be confirmed that the project emissions calculation is overall correct.		

### E.8.3. Calculation of leakage GHG emissions

<b>Means of verification</b>	<p>During the verification it has been checked whether leakage emissions have to be considered and, in cases where leakage emissions have to be calculated, the respective calculation of leakage GHG emissions has been checked. In such cases the same verification principles have been considered as for the baseline and project emissions calculation. Please refer to E.8.1 and E.8.2. The following sources of information have been used in this context:</p> <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /XLS/.</li> </ul>	
<b>Findings</b>	<input checked="" type="checkbox"/>	No leakage emissions were to be considered (LE = 0).
	<input type="checkbox"/>	<p>The calculation of the leakage emissions was found to be fully compliant with the above stated principles (see 8.1 and 8.2). The calculations of leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in leakage emissions calculations have been justified. Where applicable, appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information have been identified.</p>
	<input type="checkbox"/>	The verification team has identified mistakes in the project emissions calculation or the underlying calculation approaches.
	<input type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - N/A
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	No further comments.	

### E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

<b>Means of verification</b>	<p>The verification team has checked, if the MR includes a summary table of the emission reductions calculation specifying separately</p> <ul style="list-style-type: none"> <li>- Total baseline emissions,</li> <li>- Total project emissions,</li> <li>- Total leakage,</li> </ul>
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	- Total emission reductions. It has been assessed whether the values are correct or need to be revised as a consequence of issues identified above.	
<b>Findings-</b>	<input checked="" type="checkbox"/>	Section E.4 of the MR includes a summary table of the emission reductions calculation. The GHG emission reductions achieved in this monitoring period have been found to be 316,893 tCO <sub>2e</sub> .
	<input checked="" type="checkbox"/>	The summary table specifies the total baseline, project and leakage emissions as well as the total emission reductions separately.
	<input type="checkbox"/>	The values as specified in the ER summary table are correct; no issues have been identified during the verification which requires changes in the ER calculation.
	<input checked="" type="checkbox"/>	During the verification issues with impact on the ER calculation have been identified and thus the summary values needed to be changed. However, these issues have been addressed appropriately and PP has carried out the requested corrections.
	<input checked="" type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - CAR E.7.1
<b>Conclusion</b>	<input checked="" type="checkbox"/>	The verification team confirms that the project is in line with the respective requirements and that: <ul style="list-style-type: none"> <li>- no data was missing due to activity levels or non-activity parameters,</li> <li>- all spreadsheets including corresponding re-calculations of data during events as described in the MR were made available by the PPs, and that all formulae have been correctly implemented and are accessible and traceable,</li> <li>- any recalculation is in line with the procedure in the registered PDD and has been checked and found to be correct and conservative,</li> <li>- appropriate methods and formulae for calculating GHG emissions have been followed,</li> <li>- no pro-rata approach is applicable, and</li> <li>- the first day in which CERs are being claimed has been correctly specified.</li> </ul>
	<input checked="" type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	No further comments.	

#### E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

<b>Means of verification</b>	The verification team has checked, if the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD. It has further checked, which of the below listed cases is applicable for the calculated ER of the current monitoring period.	
<b>Findings</b>	<input type="checkbox"/>	Case 1: The ex-ante estimated value was found to be proportionally higher than the ex-post determined value. No further action is deemed required.
	<input checked="" type="checkbox"/>	Case 2: The ex-ante estimated value fits very good to the actually monitored value. No further justification is deemed required.
	<input type="checkbox"/>	Case 3: The ex-ante estimated value was found to be proportionally lower than the ex-post determined value.
	<input type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - N/A
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings



	could be closed out. For details please refer to Appendix 4.
	The actual monitored ER and the ex-ante value differ less than 5 %.

**E.8.6. Remarks on difference from estimated value in registered PDD**

<b>Means of verification</b>	On the basis of the above comparison of actual values of the monitoring period with the estimations in the registered PDD (E.8.5) the verification team has checked whether (in case 3) an appropriate explanation is included in the MR.	
<b>Findings</b>	<input checked="" type="checkbox"/>	No further justification or explanation is deemed required as actual emissions of this MP do not exceed significantly the ex-ante calculated emission reductions (applicable for case 1 and 2).
	<input type="checkbox"/>	For case 3: The PP has provided a related justification in the MR. The reasons for the increase are as follows: - N/A
	<input type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - N/A
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	Despite the above, the PPs have addressed the difference and the justifications provided where found to be reasonable and the underlying facts have been verified by the verification team.	

**E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

Means of verification	The verification team has checked chapter E.7 of the MR and the emission reduction calculation sheet /XLS/.										
Findings	<input checked="" type="checkbox"/>	The MR in section E.7 includes a summary table of the ER breakdown a) ER up to 31/12/2012 and b) ER from 01/01/2013 onwards									
	<input checked="" type="checkbox"/>	The breakdown of the ERs during the first commitment period and from 01/01/2013 onwards is as follows: <input type="checkbox"/> The ER have completely been generated during the first commitment period <input checked="" type="checkbox"/> The ERs have completely been generated from 01/01/2013 onwards, <input type="checkbox"/> The ERs have partly been generated during the first commitment period and partly from 01/01/2013 onwards.									
	<input checked="" type="checkbox"/>	The breakdown of the ERs is correct, considering the applicable guidance.									
	<table><tr><td></td><td>until 31/12/2012 <sup>1)</sup></td><td>from 01/01/2013 <sup>1)</sup></td><td>Sum</td></tr><tr><td>GHG emission reductions [tCO<sub>2</sub>e] achieved in the monitoring period</td><td>-</td><td>316,893</td><td>316,893</td></tr></table>				until 31/12/2012 <sup>1)</sup>	from 01/01/2013 <sup>1)</sup>	Sum	GHG emission reductions [tCO <sub>2</sub> e] achieved in the monitoring period	-	316,893	316,893
		until 31/12/2012 <sup>1)</sup>	from 01/01/2013 <sup>1)</sup>	Sum							
GHG emission reductions [tCO <sub>2</sub> e] achieved in the monitoring period	-	316,893	316,893								
<sup>1)</sup> This day is included.											

<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. The verification team confirms that the project is in line with the respective requirements.
	<input type="checkbox"/>	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The data provided in the MR is correct as well as the related breakdown. The pro-rata approach was not required to be applied to the calculations of GHG emission reductions or net anthropogenic GHG removals in accordance with the project standard.

## SECTION F. Internal quality control

Before the submission of the final verification report a technical review of the whole verification procedure was carried out. The technical reviewers are competent GHG auditors being appointed for the scope this project falls under. The technical reviewers are not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the verification opinion and the topic specific assessments as prepared by the verification team leader may have been confirmed or revised. Furthermore reporting improvements might have been achieved.

After the successful technical review an overall (esp. procedural) assessment of the complete verification has been carried out by a senior assessor located in the accredited premises of TÜV NORD.

After this step the submission for requesting for issuance is conducted.

**SECTION G. Verification opinion**

CARBON Climate Protection GmbH has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 31<sup>st</sup> periodic verification of the project:

*“Catalytic N<sub>2</sub>O destruction project in the tail gas of the  
Nitric Acid Plant of Abu Qir Fertilizer Co.”*

With regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to the introduction of a tertiary technology for N<sub>2</sub>O reduction in the tail gas stream of the nitric acid production plant in Abu Qir.

This verification covers the period from 11/01/2017 to 08/04/2017 (including both days).

As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated PDD,
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., ACM0019 version 02.0,
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately (except the delayed calibration of the meters AT-218002 and FT-21492 – for which appropriate adjustments to the measured values have been applied).
- the monitoring system is in place and functional. The project has generated GHG emission reductions,
- the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.
- The first day of this monitoring period is directly following the previous monitoring period.

TÜV NORD JI/CDM CP further confirms that the project has achieved ER in the above mentioned reporting period as follows:

GHG ER: 316,893 tCO<sub>2</sub>e.

**SECTION H. Certification statement**

As a duly accredited DOE, TÜV NORD CERT confirms that the project

*“Catalytic N<sub>2</sub>O destruction project in the tail gas of the  
Nitric Acid Plant of Abu Qir Fertilizer Co.”*

registered under

UNFCCC-No.: 0490

has achieved emission reductions in accordance with all applicable requirements for registered CDM project activities that would not have occurred in the absence of the project activity during the current monitoring period

MP-No.: 31 (= MP 4/CP.2)

from: 11/01/2017

to: 08/04/2017

(including both days) as follows:

GHG ER: 316,893 tCO<sub>2</sub>e.

The DOE certifies that the emission reductions are based on verifiable evidence.

Essen, 03/07/2017



R. Winter  
Team leader

## Appendix 1. Abbreviations

Abbreviations	Full texts
AOR	Ammonia Oxidation Reactor
AFC	Abu Qir Fertilizer Co.
AST	Annual Surveillance Test
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CER	Certified Emission Reduction
CDM	Clean Development Mechanism
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CL	Clarification Request
DAL	Data Aggregation Level
DVR/DverR	Draft Verification Report
ER	Emission Reduction
esp.	Especially
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IM	Interview Memo
MP	Monitoring Plan // Monitoring Period
MR	Monitoring Report
N.A.	Not applicable
NA	Nitric Acid
ODL	Original Data Level
PA	Project Activity
PDD	Project Design Document
PP	Project Participant

<b>PRC</b>	<b>Post Registration Change</b>
<b>QA/QC</b>	<b>Quality Assurance / Quality Control</b>
<b>SB</b>	<b>Standardized Baseline</b>
<b>UNFCCC</b>	<b>United Nations Framework Convention on Climate Change</b>
<b>VT</b>	<b>Verification Team</b>
<b>VVS</b>	<b>Validation and Verification Standard</b>
<b>XLS</b>	<b>Emission Reduction Calculation Spreadsheet</b>

## Appendix 2. Competence of team members and technical reviewers



### Statement of Competence

Appointment and authorization according to the procedures of the TÜV NORD JICDM Certification Program

**Mr. Rainer Winter**

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2016-07-01
J1	Senior Assessor Technical Reviewer	2016-07-01
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2016-07-01

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.1	Thermal Energy Generation	
1.2	Renewables	
4.1	Cement and lime production	
4.2	Paper	
5.1	Chemical Industry	
5.2	Caprolactam, nitric and adipic acid	
8.1	Mining/mineral production	
9.1	Aluminium and magnesium production	
9.2	Iron, steel and Ferro-alloy production	
11.2	Refrigerant gas production	
12.1	Chemical industry	
13.1	Solid waste and wastewater	

003 - Rev. 9, Date: 2015-05-18

003\_003\_S01-VA050-F01\_01\_16\_rev9.doc

001-VA050-F01 rev3 / 2012-10-25



### Statement of Competence

Appointment and authorization according to the procedures of the TÜV NORD JICDM Certification Program

**Mr. Stefan Winter**

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2017-07-27
VCS	Senior Assessor (Validation, Verification) Technical Reviewer	2017-07-27

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.1	Thermal energy generation
1.2	Renewables
2.1	Energy distribution
3.1	Energy demand
4.1	Cement and lime production
4.2	Paper
5.2	Caprolactam, nitric and adipic acid
9.1	Aluminium and magnesium production
9.2	Iron, steel and Ferro-alloy production
13.1	Solid waste and wastewater
13.2	Manure

163 - Rev. 4, Date: 2015-01-05

163\_S01-VA050-F01\_2015-01-05\_rev4.doc

001-VA050-F01 rev3 / 2012-10-25



### Statement of Competence

Appointment and authorization according to the procedures of the TÜV NORD JICDM Certification Program

**Mr. Ramy Marei**

SCHEME	STATUS	VALID UNTIL
CDM	Trainee	2014-02-01
VCS	Trainee	2014-02-01

194 - Rev. 0, Date: 2011-03-17

194\_S01-F003\_2011-03-17\_000

001-F003 rev0 / 2010-08-19



### Statement of Competence

Appointment and authorization according to the procedures of the TÜV NORD JICDM Certification Program

**Mr. Grzegorz Kochaniewicz**

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2019-02-08
VCS / ISO 14064-2	Senior Assessor	2019-02-08

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
3.1	Energy Demand
14.1	Afforestation and Reforestation

173 - Rev. 7, Date: 2016-02-09

173\_S01-VA050-F01\_2016-02-09\_rev7.doc

001-VA050-F01 rev3 / 2012-10-25

### Appendix 3. Documents reviewed or referenced

No.	Author	Reference	Title	References to the document	Provider
1	SGS	<b>/14001/</b>	ISO 14001 Certificate of AFC	-	Other
2	SGS	<b>/9001/</b>	ISO 9001 Certificate of AFC	-	Other
3	UNFCCC	<b>/ACM19/</b>	ACM0019 ver.02.0, "N <sub>2</sub> O abatement from nitric acid production"	<a href="http://cdm.unfccc.int/methodologies/DB/MNMFNF10VUEQJACEIRX3EHYC9QXGDC">http://cdm.unfccc.int/methodologies/DB/MNMFNF10VUEQJACEIRX3EHYC9QXGDC</a>	Other
4	Several authors	<b>/CAL/</b>	Calibration documents	-	Other
5	DOE	<b>/CPM/</b>	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)	(internal)	Other
6	PP	<b>/DR/</b>	Daily reports (in CSV and MDI format)	-	Other
7	Emerson Process Management	<b>/DV-CF/</b>	Technical Information by Emerson regarding calibration frequency of the Delta-V system	-	Other
8	Emerson Process Management	<b>/DV-VC/</b>	Technical Information by Emerson regarding version control of the Delta-V system	-	Other
9	AFC	<b>/GC/</b>	Gas-chromatograph Tail gas analysis reports	-	Other
10	UNFCCC	<b>/GOT/</b>	Glossary "CDM terms" (version 08.0)		Other
11	PP	<b>/IL/</b>	List of installed instruments and calibration status	-	Other
12	IPCC	<b>/IPCC/</b>	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book 3. IPCC publications	<a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a>	Other
13	KROHNE Messtechnik	<b>/K-CF/</b>	Technical Information by Krohne regarding calibration frequency of the variable area flowmeter	-	Other
14	UNFCCC	<b>/KP/</b>	Kyoto Protocol (1997)	<a href="http://unfccc.int/kyoto_protocol/items/2830.php">http://unfccc.int/kyoto_protocol/items/2830.php</a>	Other
15	UNFCCC	<b>/MA/</b>	Decision 3/CMP. 1 (Marrakesh – Accords)	<a href="http://cdm.unfccc.int/Reference/COPMOP/index.html">http://cdm.unfccc.int/Reference/COPMOP/index.html</a>	Other
16	Several authors	<b>/MCC/</b>	Maintenance and Calibration Certificates	-	Other
17	PP	<b>/MR/</b>	Monitoring Report for CDM project: "Catalytic N <sub>2</sub> O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co." Version 1, dated 10/04/2017 "Catalytic N <sub>2</sub> O destruction project in the tail gas of the Nitric Acid Plant of	-	Other



			Abu Qir Fertilizer Co.” Version 1.1, dated 09/05/2017		
18	UNFCCC	<b>/MRT/</b>	Monitoring Report Form (CDM-MR-FORM), Version 5.1	<a href="https://cdm.unfccc.int/Reference/PDDs_Forms/index.html">https://cdm.unfccc.int/Reference/PDDs_Forms/index.html</a>	Other
19	GASCO	<b>/NGC/</b>	Natural gas Certificates	-	Other
20	UNFCCC	<b>/PDD/</b>	PDD for CDM project: “Catalytic N <sub>2</sub> O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co.” Version 4.1, dated 11/09/2013	<a href="http://cdm.unfccc.int/Projects/DB/TUEV-SUED1151930566.53/view">http://cdm.unfccc.int/Projects/DB/TUEV-SUED1151930566.53/view</a>	Other
21	UNFCCC	<b>/PS/</b>	CDM Project Standard (Version 9.0)		Other
22	TÜV Rheinland	<b>/QAL1/</b>	QAL 1 Certificate of the annubar probe	-	Other
23	AIRTEC	<b>/QAL2/</b>	QAL 2 Report according to EN 14181 dt. 2014-08-14	-	Other
24	PP	<b>/QAL3/</b>	Shewhart control cards / QAL 3 records	-	Other
25	PP	<b>/QMS/</b>	Quality Management System Procedures	-	Other
26	UNFCCC	<b>/SAMPLE/</b>	“Guidelines for Sampling and Surveys for CDM Project Activities and Programme Activities” (Version 03.0) “Standard for Sampling and Surveys for CDM Project Activities and Programme Activities” (version 4.1)		Other
27	UNFCCC	<b>/TA/</b>	<ul style="list-style-type: none"> <li>• Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion Version 2</li> <li>• Tool to determine the mass flow of a greenhouse gas in a gaseous stream Version 2.0.0</li> </ul>		Other
28	PP	<b>/VAL/</b>	Validation Report for CDM project “Catalytic N <sub>2</sub> O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co.” Revision No. 5, dated 02/12/2013	<a href="http://cdm.unfccc.int/Projects/DB/TUEV-SUED1151930566.53/view">http://cdm.unfccc.int/Projects/DB/TUEV-SUED1151930566.53/view</a>	Other
29	Several authors	<b>/VER/</b>	Documents of previous verifications (Monitoring reports, verification reports, ER calculation sheets)	<a href="http://cdm.unfccc.int/Projects/DB/TUEV-SUED1151930566.53/view">http://cdm.unfccc.int/Projects/DB/TUEV-SUED1151930566.53/view</a>	Other
30	UNFCCC	<b>/VVS/</b>	CDM Validation and Verification Standard (Version 09.0)		Other
31	PP	<b>/XLS/</b>	Initial (version 1.0) and final Emission Reductions spreadsheet (version 1.1)	-	Other
32	Airtec	<b>/AST/</b>	AST Report 2017 according to EN 14181	-	Other

## Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

<b>FAR ID</b>		<b>Section no.</b>		<b>Date:</b>	
<b>Description of FAR</b>					
-					
<b>Project participant response (1<sup>st</sup> round)</b>				<b>Date:</b>	DD/MM/YYYY
-					
<b>Documentation provided by project participant (1<sup>st</sup> round)</b>					
<input type="checkbox"/>	Changes in the PDD	Section(s):	New version No.:		
<input type="checkbox"/>	Changes in MR	Section(s):	New version No.:		
<input type="checkbox"/>	Changes in XLS	Worksheet(s):	New version No.:		
<input type="checkbox"/>	Other:				
<b>DOE assessment (1<sup>st</sup> round)</b>				<b>Date:</b>	DD/MM/YYYY
-					
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>		<input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> The finding is closed			

Table 2. CL from this verification

<b>CL ID</b>	1	<b>Section no.</b>	x	<b>Date:</b>	04/05/2017
<b>Description of CL</b>					
<i>The role of Carbon Egypt has changed with regards to monitoring. This should be reflected in the MR.</i>					
<b>Project participant response (1<sup>st</sup> round)</b>				<b>Date:</b>	09/05/2017
The organizational structure of the CDM project was revised and updated in the monitoring report according to the current situation.					
<b>Documentation provided by project participant (1<sup>st</sup> round)</b>					
<input type="checkbox"/>	Changes in the PDD	Section(s):	New version No.:		
<input checked="" type="checkbox"/>	Changes in MR	Section(s): A	New version No.:1.1		
<input type="checkbox"/>	Changes in XLS	Worksheet(s):	New version No.:		
<input type="checkbox"/>	Other:				
<b>DOE assessment (1<sup>st</sup> round)</b>				<b>Date:</b>	12/05/2017
The revision of the MR is correct.					
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>		<input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed			

Table 3. CAR from this verification

<b>CAR ID</b>	1	<b>Section no.</b>	E.7	<b>Date:</b>	04/05/2017
<b>Description of CAR</b>					
<i>The expanded uncertainty, as determined during QAL2, should be used as uncertainty to calculate the substitute values during the period of delayed calibration.</i>					
<b>Project participant response (1<sup>st</sup> round)</b>					
The expanded uncertainty determined during latest QAL2 in year 2014 was applied to parameters					

$V_{t,db,n}$  and  $v_{i,t,db}$  during the period of delayed AST of the relevant measurement instruments.

The calculation of the expanded uncertainty (= identified error of AT-218002 and FT-21492 during latest QAL2) has been adopted from the last QAL2 report (issued in 2014 by AIRTEC);

- "Attachment 1: N<sub>2</sub>O" of QAL2 report, section 7.3, p. 12/12 and
- "Attachment 2: Volume flow" of QAL2 report, section 7.3, p. 9/9

Combined standard uncertainty N<sub>2</sub>O concentration:

$$U_{C\ AMS} = \sqrt{U_{C\ QAL1}^2 + U_{C\ QAL2}^2 + U_{C\ DCS}^2}$$

$U_C$	%	Data source
$U_{C\ QAL1}$	0.71	is the uncertainty given by the manufacturer (QAL1), expressed as standard deviation;
$U_{C\ QAL2}$	0.80	standard deviation from QAL2 measurements;
$U_{C\ DCS}$	0.00	uncertainty estimated for the DCS, expressed as standard deviation <sup>2</sup>

$$U_{C\ AMS} = \sqrt{0.71^2 + 0.80^2 + 0.0^2}$$

$$U_{C\ AMS} = 1.07\%$$

Expanded uncertainty AMS (coverage factor 1.96):

$$U_{AMS} = 1.96 * 1.07 = \pm 2.10\%$$

The expanded overall uncertainty of the measured N<sub>2</sub>O concentration is **±2.10 %**.

Standard uncertainty Volume Flow:

$$U_{C\ AMS} = \sqrt{U_{C\ QAL1}^2 + U_{C\ QAL2}^2 + U_{C\ DCS}^2}$$

$U_C$	%	Data source
$U_{C\ QAL1}$	1.89	uncertainty given by the manufacturer (QAL1) in percent of certification range expressed as standard deviation;
$U_{C\ QAL2}$	0.51	uncertainty for QAL2 test in percent of measurement range (after QAL2) expressed as standard deviation;
$U_{C\ DCS}$	0.00	uncertainty estimated for the DCS expressed as standard deviation <sup>3</sup>

$$U_{C\ AMS} = \sqrt{1.89^2 + 0.51^2 + 0.0^2}$$

$$U_{C\ AMS} = 1.96\%$$

Expanded uncertainty AMS (coverage factor 1.96):

<sup>2</sup> Remark: The AMS values were taken directly from the DCS system. The uncertainty of the data transfer from AMS to the DCS system and the DCS calculations are therefore included in the QAL2 uncertainty. The uncertainties of the DCS system were set to zero (no double counting).

<sup>3</sup> Remark: The AMS values were taken directly from the DCS system. The uncertainty of the data transfer from AMS to the DCS system and the DCS calculations are therefore included in the QAL2 uncertainty. The uncertainties of the DCS system were set to zero (no double counting).

$$U_{AMS} = 1.96 * 1.96 = \pm 3.84\%$$

The expanded uncertainty of the measured volume flow under standard condition is  $\pm 3.84\%$ .

The company AIRTEC has performed the AST in year 2017 (delayed calibration), which passed successfully and confirmed the validity of the values determined during QAL2 in year 2014, which is the source of the applied parameters in the Emission Reduction calculation sheet.

The application of these maximum permissible errors in the ER calculation can be tracked in the submitted excel worksheet:

- $N_2O$  concentration ( $v_{i,t,db}$ )
  1. **Column R** shows the raw data for the period of delayed calibration only.
  2. **Column L** shows the raw data under consideration of applied recalculation – if any; e.g. delay of calibration by applying the expanded overall uncertainty of the measured  $N_2O$  concentration ( $v_{i,t,db}$ ) of  $\pm 2.10\%$  (reference to column R).
  3. **Column M** shows the data after applying QAL2 / QAL3 factors (if applicable; reference to column L).

➔ A recalculation was applied for the whole period (From: scheduled date of calibration – To: actual date of calibration) → in accordance with para. 395 VVS version 9 the expanded equipment uncertainty of 2.10% acc. to latest QAL 2 report was applied.
- Volume flow ( $V_{t,db,n}$ )
  1. **Column Q** shows the raw data for the period of delayed calibration only.
  2. **Column J** shows the raw data under consideration of applied recalculation – if any; e.g. delay of calibration by applying the expanded uncertainty of the measured volume flow ( $V_{t,db,n}$ ) under standard condition is  $\pm 3.84\%$  (reference to column Q).
  3. **Column K** shows the data after applying QAL2 / QAL3 factors (if applicable; reference to column J).

➔ A recalculation was applied for the whole period (From: scheduled date of calibration – To: actual date of calibration) → in accordance with para. 395 VVS version 9 the expanded equipment uncertainty of 3.84% acc. to latest QAL 2 report was applied.

<b>Documentation provided by project participant (1<sup>st</sup> round)</b>		<b>Date:</b> 09/05/2017 // 30/06/2017
<input type="checkbox"/> Changes in the PDD	Section(s):	New version No.:
<input checked="" type="checkbox"/> Changes in MR	Section(s):	New version No.: 1.1
<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.: 1.1
<input type="checkbox"/> Other:		
<b>DOE assessment (1<sup>st</sup> round)</b>		<b>Date:</b> 12/05/2017 // 02/07/2017

The values and the calculation of the expanded uncertainties have been correctly determined, considering the results of the last QAL2 and the (delayed) AST.

The respective correction factors of 1.0384 and 1.021 have been correctly applied as per the description above on all measured values within the period of delayed AST. The results of the AST did not show any errors in the measuring equipment, thus case a) of paragraph 395 of VVS version 9, is deemed applicable.

No markup has been applied on substitute values. This is deemed to be appropriate. Further, the added detailed description is deemed satisfactory.

It can thus be confirmed that

(a) in a conservative manner, the adjusted measured values during the period of delayed calibration/AST result in fewer claimed emission reductions;

(b) For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration the respective correction factors have been applied.

<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> Additional action should be taken (finding remains open)
	<input checked="" type="checkbox"/> The finding is closed

<b>CAR ID</b>	2	<b>Section no.</b>	E.5	<b>Date:</b>	04/05/2017
<b>Description of CAR</b>					
The monitoring plan has been registered using version 2 of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" whereas the MR refers to version 3 of this tool.					
<b>Project participant response (1<sup>st</sup> round)</b>					
The correct version number of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" is now applied in accordance with the registered, approved monitoring plan and mentioned throughout the documents.					
<b>Documentation provided by project participant (1<sup>st</sup> round)</b>					<b>Date:</b>
<input type="checkbox"/> Changes in the PDD					Section(s):
<input checked="" type="checkbox"/> Changes in MR					New version No.:
<input type="checkbox"/> Changes in XLS					New version No.: 1.1
<input type="checkbox"/> Other:					Worksheet(s):
					New version No.:
<b>DOE assessment (1<sup>st</sup> round)</b>					<b>Date:</b>
Version 02.0.0 of the tool has now been referenced correctly in the MR.					
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> Additional action should be taken (finding remains open)				
	<input checked="" type="checkbox"/> The finding is closed				

<b>CAR ID</b>	3	<b>Section no.</b>	E.6	<b>Date:</b>	04/05/2017
<b>Description of CAR</b>					
The monitoring plan information provided for the parameter $V_{t,db,n}$ in section "Monitoring equipment" shows mismatches with regards to the installed probe and transmitter.					
<b>Project participant response (1<sup>st</sup> round)</b>					
The information given for the parameter $V_{t,db,n}$ in section D was reviewed and updated according to the current situation showing now both, probe and transmitter information.					
<b>Documentation provided by project participant (1<sup>st</sup> round)</b>					<b>Date:</b>
<input type="checkbox"/> Changes in the PDD					Section(s):
<input checked="" type="checkbox"/> Changes in MR					New version No.:
<input type="checkbox"/> Changes in XLS					New version No.: 1.1
<input type="checkbox"/> Other:					Worksheet(s):
					New version No.:
<b>DOE assessment (1<sup>st</sup> round)</b>					<b>Date:</b>
The updated information given for the parameter $V_{t,db,n}$ is considered appropriate and complete.					
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> Additional action should be taken (finding remains open)				
	<input checked="" type="checkbox"/> The finding is closed				

Table 4. FAR from this verification

<b>FAR ID</b>		<b>Section No.</b>		<b>Date:</b>	
<b>Description of FAR</b>					
-					
<b>Project participant response</b>					<b>Date:</b>
					DD/MM/YYYY
<b>Documentation provided by project participant</b>					
<input type="checkbox"/> Changes in the PDD					Section(s):
<input type="checkbox"/> Changes in MR					New version No.:
<input type="checkbox"/> Changes in XLS					New version No.:
<input type="checkbox"/> Other:					Worksheet(s):
					New version No.:
<b>DOE assessment</b>					<b>Date:</b>
					DD/MM/YYYY

<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification

## Appendix 5. Monitored Parameters

**Table A-5:** Periodic Verification Checklist – Monitored Parameters

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>A. <math>P_{\text{production},y}</math></b>		<b>Nitric acid produced in year y</b>		
<p><b>a) Measurement / Determination method (VVS, §§ 389, 393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	/PDD/ /ACM19/	<p><i>Description:</i>  As per registered PDD and in line with the related methodology, the production of Nitric acid is monitored by the installed equipment.</p> <p>An electromagnetic flow meter measures the flow and the thermocouple measures the temperature. The meters are located downstream of the absorption tower of the nitric acid line. The data is recorded automatically by the DCS system on an hourly basis. Further, the nitric acid density is measured 4 times a day in the AFC laboratory and the nitric acid concentration is determined based on density and temperature based on a procedure provided by the Nitric Acid Plant manufacturer (UHDE, Germany) and in line with the AFC ISO 9001 QMS. Finally, all the data is transferred to an excel sheet to calculate the <math>\text{HNO}_3</math> (100%) production on an hourly basis.</p> <p>The data aggregation procedure applied by the PP is shown as follows:</p> <ol style="list-style-type: none"> <li>1. The DCS system records the value from the flow meter and temperature transmitter hourly (log sheet no. 409/1/2/3A/F5) and the concentration is recorded using the sheet 410/3/3/F1. By use of an excel sheet the <math>\text{HNO}_3</math> production per hour is calculated (<math>\text{DAL-1}=\text{ODL}</math>).</li> <li>2. Based on the hourly reports, the final value was reported in the MR (DAL0).</li> </ol>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>The daily data of HNO<sub>3</sub> production and concentration are logged in sheet no. 409/1/2/3 F1 which used for cross-check.</p> <p><i>Verifier's action:</i></p> <p>It was verified by onsite interview and by a check of the hourly log sheets, calculation spreadsheet, against the "Procedures for CDM Project", the MP and the applied methodology.</p> <p>Furthermore, the following actions have been taken by the verification team to check the correctness of the data aggregation:</p> <p>The reported value in the MR (DAL0) has been recalculated by the verification team based on the values from the hourly sheets (DAL-1). Based on the underlying original data (DAL-1=ODL), the verification team calculated the data aggregation completely independent from the calculation provided by the PP.</p> <p><i>Conclusion:</i></p> <p>Based on on-site observation and document check, it can be confirmed that the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>		
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b></p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line</i></p>	<p>/QMS/ /MCC/ /IL/ /14001/ /9001/</p>	<p><i>Description:</i></p> <p>The accuracy of the magnetic flow meter is <math>\pm 0.25\%</math>, and the accuracy of temperature transmitter is <math>\pm 0.15^\circ\text{C}</math> (in accordance with IEC 751).</p> <p>The data is measured continuously and recorded hourly.</p> <p>All the meters are calibrated according to the registered PDD and methodology.</p> <p>QA/QC procedures including calibration, maintenance and recording, procedure for monitoring staff training and compe-</p>	OK	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.</i></p>		<p>tence are established and implemented and incorporated in the ISO9001:2008 and ISO14001:2004 procedures of AFC. The emergency procedure for monitoring system is elaborated in the MR and reasonable.</p> <p>The data flow and protection process was observed during the onsite verification.</p> <p><i>Verifier's action:</i></p> <p>It was verified by on-site observation and cross checking the hourly and daily sheets, excel book and "Procedures for CDM Project" against the MR. Besides all the calibration reports, the ISO9001:2008 and ISO14001:2004 procedures of AFC were checked by the verification team.</p> <p><i>Conclusion:</i></p> <p>The accuracy of equipment used for monitoring is checked as controlled and calibrated in accordance with the monitoring plan. By check of the calibration certificates it can be confirmed that the meters were duly calibrated for this entire monitoring period.</p> <p>QA/QC procedures were established and requirements are fulfilled.</p>		
<p><b>c) Correctness (VVS, §§ 389, 393)</b> <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	<p>/MR/ /DR/ /XLS/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p><b>P<sub>production,y</sub></b> during this monitoring period has been checked and determined to be correct.</p> <p><i>Verifier's action:</i></p> <p>By means of checking the XLS against the hourly and daily sheets, excel book and "Procedures for CDM Project".</p> <p><i>Conclusion:</i></p> <p>The value given in the MR is correct.</p>	OK.	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>B. <math>h_y</math></b>		<b>Number of hours of operation in year y</b>		
<p><b>a) Measurement / Determination method (VVS, §§ 389, 393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	/PDD/ /ACM19/	<p><i>Description:</i></p> <p>As per registered PDD and in line with related methodology, the operation hours are monitored on the basis of the observed AOR temperatures.</p> <p>During times when the temperature of the two AOR ranges within the manufacturer's specification (i.e. from 850 to 910 °C), the AOR is considered to be in continuous operation. Hence, the operation hours are measured by monitoring the temperature.</p> <p>The data aggregation procedure applied by the PP is shown as follows:</p> <ol style="list-style-type: none"> <li>1. The temperature is measured and recorded automatically, the information is stored electronically on an hourly basis (DAL-1=ODL).</li> <li>2. Based on the hourly records, the final value was reported in the MR (DAL0).</li> </ol> <p><i>Verifier's action:</i></p> <p>It was verified by on-site interview and observations, checking the electronic records and paper work against the XLS.</p> <p><i>Conclusion:</i></p> <p>Based on onsite observation and document check, it can be confirmed that the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b>  In case of measured (or estimated) values, check whether the accuracy of equipment used for</p>	/MCC/ /IL/ /14001/	<p><i>Description:</i></p> <p>The temperature is measured by two independent measurement points for each reactor. Each measurement point has installed</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.</i></p>	/9001/	<p>two transmitters, one is the main signal and the other is the back-up signal.</p> <p>The accuracy of temperature transmitter is <math>\pm 0.7</math> °C; the digital accuracy is in line with IEC 584.</p> <p>The data is measured continuously and recorded hourly.</p> <p>All the meters are periodically calibrated according to the supplier's recommendation and methodology.</p> <p>QA/QC procedures including calibration, maintenance and recording; procedure for monitoring staff training and competence are established and implemented and incorporated in the ISO9001:2008 and ISO14001:2004 procedures of AFC.</p> <p>The data flow and protection process was observed during the onsite verification.</p> <p><i>Verifier's action:</i></p> <p>It was verified by on-site observation and cross check of the electronic records and paper work against the MR. Besides all the calibration reports, the ISO9001:2008 and ISO14001:2004 procedures of AFC were checked by the verification team.</p> <p><i>Conclusion:</i></p> <p>The accuracy of equipment used for monitoring is checked, controlled and calibrated in accordance with the monitoring plan. By check of the calibration certificates it can be confirmed that the meters were duly calibrated for this entire monitoring period.</p> <p>QA/QC procedures were established and requirements are fulfilled.</p>		
<p><b>c) Correctness</b> <b>(VVS, §§ 389, 393)</b></p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative</i></p>	/MR/ /XLS/	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p><b>h<sub>y</sub></b> during this monitoring period is reported in the MR based on</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>manner.</p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>		<p>the hourly electronic records.</p> <p><i>Verifier's action:</i></p> <p>By means of checking the XLS against the hourly electronic records.</p> <p><i>Conclusion:</i></p> <p>The value given in the MR is correct.</p>		
<b>C. <math>h_{r,y}</math></b>		<b>For tertiary N<sub>2</sub>O abatement, Number of hours (h) in year y where the abatement system is by-passed, underperforming or failed</b>		
<p><b>a) Measurement / Determination method (VVS, §§ 389, 393)</b></p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>	/PDD/ /ACM19/	<p><i>Description:</i></p> <p>As per the registered PDD and in line with related methodology, <math>h_{r,y}</math> is number of hours (h) in year y where the tertiary N<sub>2</sub>O abatement system is by-passed, underperforming or failing.</p> <p>When, as per ACM0019, the inequality below is true, the abatement system is deemed to be by-passed, not working or failed in the hour h. <math>F_{N2O,tailgas,h} &gt; EF_{existing,y} \times P_{NA,h}</math></p> <p>The value is determined and monitored as explained in the respective sections of parameters of <math>F_{N2O,tailgas,h}</math> (see parameters <math>V_{t,db,n}</math>, <math>V_{i,t,db}</math> and <math>C_{H2O,t,db,n}</math>), <math>EF_{existing,y}</math>, and <math>P_{NA,h}</math> (<math>P_{production,y}</math>).</p> <p><i>Verifier's action:</i></p> <p>It was verified by on-site interview and observations, checking monitoring of parameter <math>F_{N2O,tail gas,h}</math> (see parameters of <math>V_{t,db,n}</math>, <math>V_{i,t,db}</math> and <math>C_{H2O,t,db,n}</math>), <math>EF_{existing,y}</math>, and <math>P_{NA,h}</math> (<math>P_{production,y}</math>) against the calculation of <math>F_{N2O,tailgas,h} &gt; EF_{existing,y} \times P_{NA,h}</math>.</p> <p><i>Conclusion:</i></p> <p>Based on onsite observation and document check, it can be</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		confirmed that the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.		
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b></p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.</i></p>	/ACM19/	<p><i>Description:</i></p> <p>This is not a directly measured parameter; therefore the accuracy is derived from the original measurement parameters. Please refer to the respective chapters. In case accuracy requirements for the parameters <math>V_{t,db,n}</math>, <math>V_{i,t,db}</math>, <math>C_{H_2O,t,db,n}</math> and <math>P_{production,y}</math> are met this is deemed to be the case for <math>h_{r,y}</math> as well.</p> <p><i>Verifier's action:</i></p> <p>-</p> <p><i>Conclusion:</i></p> <p>-</p>	OK	OK
<p><b>c) Correctness (VVS, §§ 389, 393)</b></p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/ /XLS/	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>For all situations <math>h_{r,v}</math> is considered as 0 based on the calculation <math>F_{N_2O,tailgas,h} &gt; EF_{existing,y} \times P_{NA,h}</math>.</p> <p><i>Verifier's action:</i></p> <p>The values and the respective calculations have been checked for each hour and found to be fully correct.</p> <p><i>Conclusion:</i></p> <p>The value in the MR is deemed as appropriate based on the checking of the calculations stated in the ER worksheet.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>D. <math>V_{t,db,n}</math></b>		<b>Volumetric flow of the gaseous stream in time interval <math>t</math> on a dry basis</b>		
<p><b>a) Measurement / Determination method (VVS, §§ 389, 393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	<p>/PDD/  /ACM19/  /DV-CF/  /DV-VC/  /QAL1/  /QAL2/</p>	<p><i>Description:</i></p> <p>As per registered PDD and in line with related methodology, the volumetric flow of the gaseous stream in time interval <math>t</math> on a dry basis is monitored by an annubar probe.</p> <p>The instrument is located in the tail gas, downstream of the EnviNOx® reactor (21R004) (at stack of NA plant).</p> <p>The data is measured continuously, read secondly and recorded hourly.</p> <p>The data aggregation procedure applied by the PP is as follows:</p> <ol style="list-style-type: none"> <li>1. The differential pressure is monitored continuously, converted to volume flow and recorded hourly through the automated data logging system, Delta-V. (DAL-1=ODL).</li> <li>2. Based on the hourly reports, the final value was reported in the MR (DAL0).</li> </ol> <p>The annubar probe has undergone a QAL 2 test from 08/07/2014 to 10/07/2014 and an AST in June 2015 and in April 2017. The identified calibration factors have been applied as part of the XLS ER calculation. However, as part of the EN 14181 compliance requirements an AST has to be carried out once a year. This AST has been delayed and only been carried out at the end of the current MP. This is considered as a violation against the UNFCCC calibration requirements and is thus considered as a delayed calibration.</p> <p><i>Verifier's action:</i></p> <p>The data aggregation and calculation was verified during on-site</p>	CAR E.7.4	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>visit by means of data analysis, excel – walkthroughs and interview with the Carbon Climate Protection team using Delta-V trend curves (generated from raw data), Delta-V files and the QAL 2 report. Further a comparison with theoretical data has been checked.</p> <p>100% of the hourly records have been verified by means of data analysis tools. The data transfer from the Delta-V system has been checked on a sample basis.</p> <p><i>Conclusion:</i></p> <p>Based on onsite observation and document check, it can be confirmed that the measurement / determination method currently installed is in line with the registered monitoring plan of the PDD and the applied methodology.</p> <p>However, due to the delayed AST – in line with the VVS para 395 the maximum permissible error of the instrument has to be added to the measured values (as the AST has confirmed the results of the latest QAL2 performed in year 2014). The PP has applied the uncertainty – derived from the latest QAL2 as an additive term to the measured values.</p> <p>However, the expanded uncertainty as mentioned in Annex 6 of this document should be considered in this context. In this context CAR E.7.1 has been raised (please refer to appendix 4 for further details).</p>		
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b></p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p>	<p>/MCC/ /ACM19/ /QAL1/ /QAL2/ /DV-CF/ /DV-VC/ /14001/</p>	<p><i>Description:</i></p> <p>The annubar probe has undergone a QAL2 test. As per the respective QAL2 report the combined standard uncertainty has been determined as 1.96 % and the expanded uncertainty of the measured volume flow (= identified error) under standard conditions is <math>\pm 3.84</math> %</p> <p>QA/QC procedures are covered by the ISO 9001:2008 and ISO</p>	CAR E.7.1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.</i></p>	/9001/	<p>14001:2004 procedures of AFC of the nitric acid plant. QA procedures applied are in accordance with the monitoring plan. All transmitters were properly installed and calibrated. Instruments have a valid calibration covering the whole monitoring period. The calibration certificates were provided as evidence of the work performed. However the AST has been delayed. In this context CAR E.7.1. has been raised.</p> <p>The data flow and protection process was observed during the onsite verification.</p> <p><i>Verifier's action:</i></p> <p>It was verified by on-site observation and cross checking the Delta-V trend curves (generated from raw data) and Delta-V mdi files against the MR. Besides all the calibration reports, the ISO9001:2008 and ISO14001:2004 procedures of AFC were checked by the verification team.</p> <p><i>Conclusion:</i></p> <p>QA/QC procedures were established and requirements are fulfilled. The accuracy of equipment used for monitoring is checked, controlled and calibrated in accordance with the monitoring plan except for delay in calibration (refer CAR E.7.1). By check of the calibration certificates it can be confirmed that the meters were duly calibrated post the due date of validity and the determined error was below the maximum permissible error.</p>		
<p><b>c) Correctness</b> <b>(VVS, §§ 389, 393)</b></p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p>	/MR/ /XLS/	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p>Pending closure of CAR E.7.1.</p>		OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>				
<b>E. <math>v_{i,t,db}</math></b>		<b>Volumetric fraction of greenhouse gas <math>i</math> in a time interval <math>t</math> on a dry basis</b>		
<p><b>a) Measurement / Determination method (VVS, §§ 389, 393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	<p>/IM01/  /PDD/  /ACM19/  /DV-CF/  /DV-VC/  /GC/</p>	<p><i>Description:</i></p> <p>As per registered PDD and in line with the applicable methodology, the volumetric fraction of the greenhouse gas <math>i</math> in a time interval <math>t</math> on a dry basis is monitored by the EnviNOx®-System NDIR analyzer supplied by Emerson.</p> <p>The sample take-off is located in the tail gas line, downstream of the EnviNOx® reactor (21R004) and leads (via sample gas line) to the analyzer house (located close to the EnviNOx® reactor), where analyzers and standard gases for calibrations are installed.</p> <p>The data is measured continuously, read secondly and recorded hourly.</p> <p>The data aggregation procedure applied by the PP is shown as follows:</p> <ol style="list-style-type: none"> <li>1. The concentration of <math>N_2O</math> in the tail gas is continuously measured by non-dispersive infrared photometry (NDIR) analyzer, which is self-calibrated, using a set of certified gases. The <math>N_2O</math> concentration is measured in ppmv and automatically converted to <math>tN_2O/Nm^3</math> and <math>Nm^3 N_2O / Nm^3</math> dry gas recorded through the automated data logging system, DeltaV, and hourly reports are generated including the values in ppm and <math>mgN_2O/Nm^3</math> (DAL-1=ODL).</li> <li>2. Based on the hourly reports, the final value was reported in the MR (DAL0).</li> </ol> <p>The analyzer has undergone a QAL 2 test from 08/07/2014 to 10/07/2014 and an AST in June 2015 and April 2017. The</p>	CAR E.7.4	OK

<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
		<p>identified calibration factors have been applied as part of the XLS ER calculation. However, as part of the EN 14181 compliance requirements an AST has to be carried out once a year. This AST has been delayed and only been carried out at the end of the current MP. This is considered as a violation against the UNFCCC calibration requirements and is thus considered as a delayed calibration.</p> <p>As per EN 14181 the AST is mandatory for the measurement of the N<sub>2</sub>O outlet concentration (<math>v_{i,t,db}</math>). As the AST is usually carried out together with the annubar probe the finding related to the application of the expanded uncertainty to account for the delayed calibration applies for this parameter accordingly. The CAR E.7.1 has been raised in this context.</p> <p><i>Verifier's action:</i></p> <p>The N<sub>2</sub>O concentration values were verified during on-site visit, by means of data comparison tests, interviews and observations. The Delta-V hourly reports, Delta-V trend curves the XLS as well as QA/QC documentation has been checked. Further also the results of the periodic Gas Chromatography measurements have been analyzed and compared with the NDIR measurement results.</p> <p>100% of the hourly records have been evaluated during the verification, whereas the data transfer from the Delta-V system has only been checked on a sample basis.</p> <p><i>Conclusion:</i></p> <p>Based on onsite observation and document check, it can be confirmed that the measurement / determination method currently installed is in line with the registered monitoring plan of the PDD and the applied methodology.</p> <p>However, due to the delayed AST – in line with the VVS para 395 the maximum permissible error of the instrument has to be</p>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>added to the measured values (as the AST has confirmed the results of the latest QAL2 performed in 2014). The PP has applied the uncertainty – derived from the latest QAL2 as an additive term to the measured values.</p> <p>However, the expanded uncertainty as mentioned in Annex 6 of this document should be considered in this context. In this context CAR E.7.1 has been raised (please refer to appendix 4 for further details).</p>		
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b></p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.</i></p>	<p>/MCC/ /QAL2/ /14001/ /9001/</p>	<p><i>Description:</i></p> <p>The accuracy of the NDIR analyser is considered as determined during the last QAL 2 (zero/span). The expanded overall uncertainty of the measured N<sub>2</sub>O concentration (= identified error of gas analyzer system) is ±2.10 % as determined during last QAL2 in year 2014.</p> <p>The accuracy of the span gas is also specified as ±1%.</p> <p>Numerous QA/QC checks, such as</p> <ul style="list-style-type: none"> <li>- check of analytical function (zero and span check),</li> <li>- EN 14181 compliance (QAL 1 to QAL 3),</li> <li>- Regular checks by the plant maintenance team,</li> <li>- Service checks by the manufacturer and</li> <li>- Data checks by the CDM team</li> </ul> <p>are carried out in order to ensure a high data integrity level. The accuracy and the QA/QC check intervals of the monitoring equipment are in accordance with the relevant guidance provided by the CDM Executive Board and in accordance with the monitoring plan.</p> <p>Factory instructions by Emerson Process Management for</p>	CAR E.7.1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>accuracy safeguarding are followed and complied. These are related to regular self-calibration and quality of used calibration gases.</p> <p>The test gas covers the usual measuring range appropriately.</p> <p>QA/QC procedures are documented in the ISO9001:2008 and ISO14001:2004 procedures of AFC of the nitric acid plant. QA procedures applied are in accordance with the monitoring plan.</p> <p><i>Verifier's action:</i></p> <p>The various QA/QC measures and related documentation have been checked during the on-site visit and afterwards on the basis of the submitted full documentation.</p> <p><i>Conclusion:</i></p> <p>QA/QC procedures have been established and requirements are deemed to be fulfilled except for delay in calibration (refer CAR E.7.1). No deviations from the implemented procedures, the PDD and the MP have been identified. Thus it can be confirmed that the meters were duly operated for this entire monitoring period but provisions for delayed calibration have to be adjusted (CAR E.7.1).</p>		
<p><b>c) Correctness</b> <b>(VVS, §§ 389, 393)</b></p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> Please refer to CAR E.7.1.</p>	CAR E.7.1	OK
<b>F. C<sub>H2O,t,db,n</sub></b>		<b>Moisture content of the gaseous stream at normal</b>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<b>conditions in the time interval t</b>		
<p><b>a) Measurement / Determination method (VVS, §§ 389, 393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	<p>/PDD/  /ACM19/  /QAL2/  /unfccc/  /TA/</p>	<p><i>Description:</i>  As per registered PDD and in line with related methodology, the moisture content of the gaseous stream at normal conditions is measured according to the USEPA CF42 method 4 – Gravimetric determination of water content. 3 measurements have been carried out on 06/04/2017 in the course of the AST test. It was determined that the moisture content is well below the threshold value as per the “Tool to determine the mass flow of a GHG in a gaseous stream” of 0.05 kgH<sub>2</sub>O/m<sup>3</sup> dry gas and thus the gas can be considered as dry (for the purpose of mass flow calculations in line with the above mentioned tool).</p> <p><i>Verifier’s action:</i>  The QAL 2 report has been checked and the referenced value could be confirmed based on check with related tool.</p> <p><i>Conclusion:</i>  Based on onsite observation and document check, it can be confirmed that the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology and the value considered is deemed correct so that the gas can be considered as dry.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b>  In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.  Describe whether all applicable QA/QC procedures</p>	<p>/MCC/  /QAL2/</p>	<p><i>Description:</i>  The measurement institute (AIRTEC) has confirmed that the measurement has been carried out in line with the above mentioned standard.</p> <p><i>Verifier’s action:</i>  The result was verified from the QAL2 and AST report</p> <p><i>Conclusion:</i></p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.		QA/QC procedures were established and requirements are fulfilled.		
<b>c) Correctness (VVS, §§ 389, 393)</b> Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.	/MR/ /PDD/ /XLS/ /QAL2/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) The applied measurement method is appropriate and the value used is deemed correct.	OK	OK
<b>G. FC<sub>i,j,y</sub></b>		<b>Quantity of fuel type i combusted in process j during the year y</b>		
<b>a) Measurement / Determination method (VVS, §§ 389, 393)</b> Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/PDD/ /ACM19/ /DV-CF/ /DV-VC/ /NGC/	<i>Description:</i> Natural gas is used as a reducing agent in the EnviNOX® system (21R004). As per registered PDD and in line with related methodological tool, the quantity of the fuel combusted in process is monitored by a standard natural gas flow meter. Pressure and temperature transmitter are installed for the conversion to standard conditions.  The meters are located in the natural gas line, upstream of the EnviNOX® reactor.  The data is measured continuously, read secondly and recorded hourly.  The data aggregation procedure applied by the PP is shown as	OK	OK

<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
		<p>follows:</p> <ol style="list-style-type: none"> <li>1. The natural gas input is measured in Nm<sup>3</sup> and recorded through the automated data logging system, DeltaV, and hourly reports are generated including the values in Nm<sup>3</sup> and tCH<sub>4</sub>. (DAL-1=ODL).</li> <li>2. Based on the hourly reports, the final value was reported in the MR (DAL0).</li> </ol> <p><i>Verifier's action:</i></p> <p>It was verified during on-site visit by means of visual inspection, interviews and data analysis that the measurement system as described in the PDD is in place and correctly working. In detail values from the automated data logging system, DeltaV, have been checked on an hourly basis.</p> <p><i>Conclusion:</i></p> <p>Based on onsite observation and document check, it can be confirmed that the measurement is in line with the registered monitoring plan of the PDD and the applied methodology.</p>		
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b></p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of</i></p>	<p>/14001/ /9001/ /MCC/ /K-CF/ /DV-CF/</p>	<p><i>Description:</i></p> <p>The accuracy of natural gas flow meter is ±1.6% (in accordance with VDI/VDE 3513), the accuracy of temperature transmitter is ±0.1% of calibrated span, and the accuracy of pressure transmitter is ±0.075% of calibrated span.</p> <p>The accuracy and the calibration interval of the monitoring equipment is in accordance with the relevant guidance provided by the CDM Executive Board and is controlled and calibrated in accordance with the monitoring plan.</p> <p>The inspection reports including the test results from the calibration procedures performed were checked and the transmitters were reported to meet the applicable specifications.</p>	<p>OK</p>	<p>OK</p>

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>the installed monitoring equipment in the table in Appendix 6.</i>		<p>QA/QC procedures are covered by ISO9001:2008 and ISO14001:2004 procedures of AFC. QA procedures applied are in accordance with the monitoring plan. The meters were properly installed and calibrated. Instruments have a valid calibration covering the whole monitoring period. The calibration certificates were provided as evidence of the work performed.</p> <p>The data flow and protection process was observed during the onsite verification.</p> <p><i>Verifier's action:</i></p> <p>It was verified by on-site observation and checking the calibration records against the MR. Besides the ISO9001:2008 and ISO14001:2004 procedures of AFC were checked by the verification team.</p> <p><i>Conclusion:</i></p> <p>The accuracy of equipment used for monitoring is checked, controlled and calibrated in accordance with the monitoring plan. By check of the calibration certificates it can be confirmed that the meters were duly calibrated for this entire monitoring period.</p> <p>QA/QC procedures were established and requirements are fulfilled.</p>		
<p><b>c) Correctness</b> <b>(VVS, §§ 389, 393)</b> <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/ /PDD/ /XLS/	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>The applied measurement methods, the equipment installed and the results achieved are deemed appropriate and thus the final value used for ER calculation is deemed correct.</p>	OK	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>H. <math>w_{C,i,y}</math></b>		<b>Weighted average mass fraction of carbon in fuel type i in year y</b>		
<p><b>a) Measurement / Determination method (VVS, §§ 389, 393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	<p>/PDD/  /ACM19/  /NGC/</p>	<p><i>Description:</i></p> <p>As per registered PDD and in line with related methodology, the weighted average mass fraction of carbon in the natural gas is derived from the certificate of hydrocarbon supplier.</p> <p>The certificate is supplied by the hydrocarbon supplier at least once per year. The mass fraction of carbon is calculated based on the analysis as shown in the certificate.</p> <p><i>Verifier's action:</i></p> <p>During on-site visit the certificates and the calculation have been checked. Further the calculation has been reproduced and found to be fully correct.</p> <p><i>Conclusion:</i></p> <p>Based on onsite observation and document check, it can be confirmed that the analysis of the natural gas used is appropriate and correct. The calculation method for the weighted average is deemed to be correct.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b>  In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line</p>	<p>/MCC/  /GC/</p>	<p><i>Description:</i></p> <p>The accuracy is dependent on the gas-chromatograph results as achieved and provided by the gas supplier and thus outside the control of the operator.</p> <p><i>Verifier's action:</i></p> <p>The analysis has been checked for plausibility and the calculation has been reproduced.</p> <p><i>Conclusion:</i></p> <p>The calculation is correct.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.				
<b>c) Correctness (VVS, §§ 389, 393)</b> Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.	/MR/ /XLS/ /PDD/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: The calculation is deemed correct based on check with PDD as well as XLS as well as crosscheck with further supporting documents.	OK	OK
<b>I. <math>\rho_{i,y}</math></b>		<b>Weighted average density of fuel type i in year y</b>		
<b>a) Measurement / Determination method (VVS, §§ 389, 393)</b> Describe how the monitoring parameter was measured / determined. Focus primarily on the ODL but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/PDD/ /ACM19/ /NGC/ /XLS/	Description: As per registered PDD and in line with related methodology, the weighted average density of the natural gas is derived from the analysis certificate of the hydrocarbon supplier. The certificate is supplied usually on a monthly basis, but at least once per year. The average density for a specific month has been calculated and a conservative value has been used. Verifier's action: The analysis certificates have been checked and the calculation has been reproduced. Conclusion: The value used for the ER calculation has been fully derived as described in the MP.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>b) Accuracy and QA/QC Procedure (VVS, §§ 394-400)</b> <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.  Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.  Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.</i>	/MCC/ /GC/	<i>Description:</i> The accuracy is dependent on the gas-chromatograph results as achieved and provided by the gas supplier and thus outside the control of the operator. QA/QC procedures are not applicable. <i>Verifier's action:</i> The analysis has been checked for plausibility and the calculation has been reproduced. <i>Conclusion:</i> The value used for the ER calculation has been derived as described in the MP.	OK	OK
<b>c) Correctness (VVS, §§ 389, 393)</b> <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.  In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.  In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /PDD/ /XLS/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) <i>Description:</i> The value has been calculated as described in the monitoring plan based on the registered PDD. Further XLS has been checked.	OK	OK

## Appendix 6. Calibration dates and validity of installed monitoring equipment

**Table A-6:** Periodic Verification Checklist – Calibration details

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Previous calibration (last calibration before start of this monitoring period)	Calibration date(s) during this monitoring period	Validity of calibration(s)	Delay in calibration: yes/no	Period of delayed calibration
FT21411	$P_{\text{production},y}$	0252528	Magnetic flow meter	$\pm 0.25\%$	2015-06-29	2017-01-11	2019-01-10	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
TE21042	$P_{\text{production},y}$	09846352	Temperature transmitter	$\pm 0.15^\circ\text{C}$	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
TE21014	$h_y$	2304376	Temperature transmitter	$\pm 0.7^\circ\text{C}$	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
TE21015	$h_y$	2304377	Temperature transmitter	$\pm 0.7^\circ\text{C}$	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
TE21020	$h_y$	2304378	Temperature transmitter	$\pm 0.7^\circ\text{C}$	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
TE21021	$h_y$	2304379	Temperature transmitter	$\pm 0.7^\circ\text{C}$	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
FT-21492	$V_{t,db,n}$	QAL2	Complete measuring system	3.84 % (as per QAL 2)	2014-07-10	-	2019-07-09	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
"	"	AST	Complete measuring system	3.84 % (as per QAL 2)	2015-06-09	2017-04-06	2018-04-05	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 2017-01-11 To: 2017-04-06

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Previous calibration (last calibration before start of this monitoring period)	Calibration date(s) during this monitoring period	Validity of calibration(s)	Delay in calibration: yes/no	Period of delayed calibration
“	“	13069588	Differential pressure transmitter	1.89 % (as per QAL 1)	2016-12-14	2017-03-30	2017-04-27	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
AT218002	$V_{i,t,db}$	QAL2	Complete measuring system	2.1 % (as per QAL 2)	2014-07-10	-	2019-07-09	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
“	“	AST	Complete measuring system	2.1 % (as per QAL 2)	2015-06-09	2017-04-06	2018-04-05	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 2017-01-11 To: 2017-04-06
“	“	990561462895	NDIR Analyser	±1%	Zero calibration daily Span calibration every other day	Automatically	Done on daily basis	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
FT218002	$FC_{i,j,y}$	011008523.001	Natural gas flow meter	±1.6%	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
TE218004	$FC_{i,j,y}$	2420017	Temperature transmitter	±0.1%	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
PT218004	$FC_{i,j,y}$	8657991	Pressure transmitter	±0.075%	2016-11-16	-	2018-11-15	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
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19.0	19.06.2015	Adoption of UNFCCC template to TÜV NORD guidance and instructions