




# 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>	N2O ABATEMENT PROJECT AT NITRIC ACID PLANT NO. 11 AT AFRICAN EXPLOSIVES LTD. (AEL), SOUTH AFRICA
<b>Reference number of the project activity</b>	UNFCCC ID: 1364 TN P-No. : 8000457336 – 16/028
<b>Version number of the verification and certification report</b>	1.1
<b>Completion date of the verification and certification report</b>	07/07/2016
<b>Monitoring period number and duration of this monitoring period</b>	MP 8 23/10/2014 – 05/01/2016 (including both days)
<b>Version number of monitoring report to which this report applies</b>	03
<b>Crediting period of the project activity corresponding to this monitoring period</b>	08/02/2008 to 07/02/2018
<b>Project participant(s)</b>	AEL Mining Services Limited N.serve Environmental Services GmbH Nordic Enviroment Finance Corporation
<b>Host Party</b>	South Africa
<b>Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)</b>	Scope: 5 / Technical Area: 5.2 CDM Methodology: AM0034 ver.2 "Catalytic reduction of N2O inside the ammonia burner of nitric acid plants"
<b>Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD</b>	320,007 t CO <sub>2e</sub>
<b>Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period</b>	298,109 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>	 <p>Rainer Winter Final Approver</p>
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**SECTION A. Executive summary**

AEL Mining Services Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 8th periodic verification of the project:

“N<sub>2</sub>O ABATEMENT PROJECT AT NITRIC ACID PLANT NO. 11 AT AFRICAN  
EXPLOSIVES LTD. (AEL), SOUTH AFRICA”

with regard to the relevant requirements for CDM project activities.

This verification covers the period from 23/10/2014 to 05/01/2016 (including both days).

The project activity aims to reduce levels of N<sub>2</sub>O emissions from the production of nitric acid with secondary N<sub>2</sub>O abatement technology (secondary catalyst).

Details of the project location are given in table A-1 below:

**Table A-1:** Project Location

No.	Project Location
Host Country	South Africa
Region:	Gauteng / Modderfontein
Project location address:	PO Modderfontein 1645, Johannesburg
Latitude:	26°05'50" South
Longitude:	28°10'26" East

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

**Table - A-2:** Technical data of the project activity

Parameter	Unit	Value
Design capacity	100% tHNO <sub>3</sub> /a	282,875 (775 metric tonnes per day with 365 operating days per year)
OT <sub>normal</sub>	°C	820 – 905
OP <sub>normal</sub>	kPa (gauge)	365 - 450
AFR <sub>max</sub>	tNH <sub>3</sub> /h	9.094
AIFR <sub>max</sub>	%	11,5
CL <sub>normal</sub>	tHNO <sub>3</sub>	127,302.4
CL <sub>BL</sub>	tHNO <sub>3</sub>	134,700
GS <sub>normal</sub> (Gauze supplier for the campaigns under this monitoring period)	-	W.C Heraeus
GC <sub>normal</sub> (Gauze composition for the campaigns under this monitoring period)	%	Platinum (Pt) 56.5 Rhodium (Rh) 3.8 Palladium (Pd) 39.7

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 project design document.
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., AM0034 ver. 2
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 8th 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:

Emission reductions: 298,109 t CO<sub>2</sub>e

## 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	Stefan	TÜV NORD CERT	x	x	x	x
2.	Verifier	EI	Kochaniewicz	Gregor	-	x	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	EI	Li	Yongjun	-
2.	Technical Reviewer/Approver	IR	Winter	Rainer	TÜV NORD CERT

## 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
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	Threshold	Related to
<input 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 checked="" 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 project activity. 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 equipment	Medium	Dysfunction of equipment might lead to wrong measuring results	Check of operational data
3.	Exchange of measurement equipment	Medium	Exchange of measurement equipment might lead to incorrect data processing	Check of serial-numbers of installed measurement equipment
4.	Wrong or insufficient quality assurance of monitoring equipment	High	Wrong or insufficient QA/QC might lead to incorrect monitoring results	Check of <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</li> </ul>

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

				<i>involved entities and personnel</i>
5.	<i>Mismatch 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>- <i>Data aggregation trails</i></li> <li>- <i>IT systems</i></li> <li>- <i>Spreadsheet programming</i></li> <li>- <i>Data protection measures</i></li> <li>- <i>responsibilities</i></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. A detailed audit/verification plan has been prepared and submitted to the project participant(s) 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<sup>+</sup></i>	<i>Errors* detected</i>	<i>Findings reference</i>	<i>Corrected</i>	<i>Remaining verification risk</i>
NCSG	COM	<input checked="" type="checkbox"/>	CAR 04, CAR 05	<input checked="" type="checkbox"/>	Not material
VSG	COM	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Not material
PE <sub>n</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
OH <sub>n</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
NAP	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
TSG	COM	<input checked="" type="checkbox"/>	CAR 04, CAR 05	<input checked="" type="checkbox"/>	Not material
PSG	COM	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Not material
EF <sub>n</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
EF <sub>ma,n</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
EF <sub>p</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
EF <sub>min</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
EF <sub>reg</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
CL <sub>n</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
OP <sub>h</sub>	COM	<input checked="" type="checkbox"/>	CAR 04	<input checked="" type="checkbox"/>	Not material
OT <sub>h</sub>	COM	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Not material
AFR	COM	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Not material
AIFR	COM	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Not material
GS <sub>project</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
GC <sub>project</sub>	CDC	<input type="checkbox"/>		<input type="checkbox"/>	Not material
Aggregate					Materiality threshold not exceeded

<sup>\*)</sup> incl. omissions and misstatements

<sup>+) Verification Approaches:</sup>

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 the 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 client and publicly available documents relevant for the verification were reviewed. 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 monitoring report, 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**

Duration of on-site inspection: 15/03/2016 to 16/03/2016				
No.	Activity performed on-site	Site location	Date	Team member
1.	<b>Opening Meeting:</b> <ul style="list-style-type: none"> <li>• Introduction of participants;</li> <li>• Detailed audit planning;</li> <li>• Induction by the plant</li> </ul>	AEL Mining Ltd	15/03/2016	Stefan Winter, Gregor Kochaniewicz
2.	Check of operation and management changes, with regards to application of new methodology	AEL Mining Ltd		
3.	<ul style="list-style-type: none"> <li>• Plant performance and update on recent changes and QA/QC measures:</li> <li>• Changes of <ul style="list-style-type: none"> <li>• Technical Setup</li> <li>• Instrumentation</li> <li>• Personnel / Responsibilities</li> </ul> </li> <li>• Plant performance <ul style="list-style-type: none"> <li>• Shut-downs,</li> <li>• Gauze changes</li> <li>• Problems</li> </ul> </li> <li>• QAL2 measurements</li> <li>• Other calibrations</li> </ul>	AEL Mining Ltd		
4.	<b>Preparation of site visit:</b> <ul style="list-style-type: none"> <li>• PPE etc.</li> <li>• P&amp;I diagrams</li> <li>• Technical Specifications</li> </ul>	AEL Mining Ltd		
	<b>Site/Plant Visit:</b> <ul style="list-style-type: none"> <li>• Control room</li> <li>• Analyzer cabinet</li> <li>• Field equipment</li> <li>• Laboratory</li> </ul>	AEL Mining Ltd		
5.	<b>Data analysis and calculation:</b> <ul style="list-style-type: none"> <li>• Raw data analysis</li> <li>• Check of DCS programming</li> <li>• Check of ER calculation</li> <li>• Counter calculation</li> </ul>	AEL Mining Ltd	16/03/2016	
6.	<b>Check of additional evidences:</b> <ul style="list-style-type: none"> <li>• Technical data of the plant</li> <li>• Situation of legislation</li> </ul>	AEL Mining Ltd		
7.	<b>Quality Management System:</b> <ul style="list-style-type: none"> <li>• Check of ISO certificates</li> <li>• Calibration procedure</li> <li>• Data storage/Back-up</li> <li>• Data aggregation and processing</li> <li>• Qualification of personnel</li> </ul>	AEL Mining Ltd		
8.	<b>Closing meeting</b>	AEL Mining Ltd		

**D.3. Interviews**

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Burger	Hendrik	AEL	16/03/2016	All issues	Stefan Winter, Gregor Kochaniewicz
2.	Gutknecht-Stöhr	Niko	n.serve			
3.	Govender	Dan	AEL			

**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
	<i>n.a.</i>				

<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
	NCSG	SiRS	COM	440 days / hourly data 10,560 / 2s data logging 19,008,000	hourly data 371 / 2s data logging 385
	VSG	SiRS	COM		
	TSG	SiRS	COM		
	PSG	SiRS	COM		
	OT <sub>h</sub>	SiRS	COM		
	OP <sub>h</sub>	SiRS	COM		
	AFR	SiRS	COM		
	AFIR	SiRS	COM		

1) Sampling Approaches:

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

A sampling approach has been applied by the verification team to check the data transferred from the AMS to the emission reduction excel calculation spreadsheet. The 2 sec raw data from the AMS has been checked against the hourly raw data also from AMS as AMS converts data automatically from 2 sec data to hourly aggregated data. Besides the hourly raw data from AMS has been checked against the hourly data used in ER calculation spreadsheet to determine the related emission reductions. Further the monthly summary sheets used by AEL to control the plant operation have been crosschecked with hourly data as well and used as crosscheck for the ER calculation spreadsheet. Randomly selected time periods (hours and days) have been checked to confirm the correctness of the data transfer. The amount of data to be checked has been derived applying random sampling 95% confidence interval, 5% margin of error and 50% response distribution. For the calculation of the sample size the software <http://www.raosoft.com/samplesize.html> has been used.

Based on that the following sampling has been conducted:

Parameter	Population size	Required sample size	Number of samples checked
Hourly data for OTh, OPh, AFR, AFIR, NCSG, VSG, PSG and TSG	10,560 (440 days x 24 h/d)	371	2 months = 1440 hours
2 sec raw data for OTh, OPh, AFR, AFIR, NCSG, VSG, PSG and TSG	19,008,000 (440 days x 24 h/d x 3,600 s/h / 2)	385	500

#### 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)	-	-	-
Compliance of the project implementation with the registered PDD (E.3)	-	1	-
Post-registration changes (E.4)	-	-	1
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline (E.5)	-	-	-
Compliance of monitoring activities with the registered monitoring plan (E.6)	-	1	1
Compliance with the calibration frequency requirements for measuring instruments (E.7)	-	1	1
Assessment of data and calculation of emission reductions or net removals (E.8)	2	-	-
Others (please specify)	1	2	-
<b>Total</b>	<b>3</b>	<b>5</b>	<b>3</b>

## SECTION E. Verification findings

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

<b>Means of verification</b>	<p>A draft monitoring report was submitted to the verification team by the project participants. 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 template have been followed. Every section has been checked against the respective guidance.</p> <p>The following sources of information have been used in this context:</p> <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 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:
		-
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs have been raised in this context. No correction was required in the context. 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 provided MR is in compliance with related 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 project activity.
<input type="checkbox"/>	There were no open issues which have been addressed in the previous verification report
<input checked="" 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

One FAR has been raised during last verification. During site visit for this monitoring period the related issue has been checked and it could be confirmed that the related issue has been solved. Please refer to FAR ID 01 under Table 3. In Appendix 4 of this report for further details.

### 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 form – as downloaded from the UNFCCC project site - and the checks carried out during the on-site visit an assessment 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 is has been checked if relevant technical equipment of the project activity 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>Interviews with operational personnel have been carried out, QMS records, maintenance records, instrument specifications were checked in this context. 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 PRCs.</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>• /TS/</li> <li>• /QAL1/, /QAL2/, /QAL3/</li> <li>• /LOG/</li> <li>• /unfccc/</li> </ul>	
<b>Findings</b>	<input type="checkbox"/>	The project has been implemented 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.
	<input type="checkbox"/>	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): - N/A
	<input checked="" type="checkbox"/>	<p>In this context the following CARs, CLs have been raised:</p> <p><i>CAR 01: Following issues w.r.t. downtime list in B.1 have been identified:</i></p> <ol style="list-style-type: none"> <li>1. As per check with ER calculation the period 17/12/2014 to 17/12/2015 in MR is not consistent please clarify and revise accordingly.</li> </ol>

		<p>2. For the period 11/08/2015 to 14/08/2015 and 18/08/2015 to 19/08/2015 it is stated that the reason for downtime is No data recording, plant considered offline. As per onsite interview with personnel the reason is due to network failure. Revision requested.</p> <p>3. The end date for the period when N2O Analyzer failed given as 14/08/2015 to 05/01/2015 is not reasonable and correct as per data check and interviews during site visit.</p> <p>4. Further as per onsite visit and interview with personnel the reason for "N2O analyzer failed" is not correct. The analyzer itself was working well as per QAL3 tests however no samples have been analyzed even though the analyzer was ok. The reason for none values are to be specified.</p> <p>5. The list provides two dates at the end of 04/01/2015 and 05/01/2015 which are not reasonable considering the end date of the monitoring period 05/01/2016. Revision requested.</p>
	In case of phased implementation:	
	<input checked="" type="checkbox"/>	N/A
	<input type="checkbox"/>	The phased implementation has correctly and in sufficient detail been described in the latest version of the PDD.
	<input type="checkbox"/>	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.
<input type="checkbox"/>	The project description in the PDD/MR is not deemed sufficient. The detailed implementation timeline is as follows: N/A	
<b>Conclusion</b>	<input type="checkbox"/>	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.
	<input checked="" 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 implemented as per description provided in the registered PDD. However the above stated issues as per CAR 01 have been identified.	

**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 checked="" 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 type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC

	1	Title	
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved (approval No.: )
		Appr.date	
		Ref. No.	
	2	Title	
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved (approval No.: )
		Appr.date	
		Ref.No.	
<input 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 monitoring report. 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 post registration change 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 post registration change 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.

**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 monitoring report. 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 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 monitoring report. 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 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 checked="" 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 Meth 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)																			
	<input checked="" type="checkbox"/>	The breakdown of MP accordance of the referenced tools is as follows: <table border="1"> <tr> <td>1</td><td>Title (of the tool)</td><td>Tool for demonstration and assessment of additionality</td></tr> <tr> <td></td><td>Version</td><td>7.0.0</td></tr> <tr> <td></td><td>MP compliance</td><td> <input checked="" type="checkbox"/> full compliance  <input type="checkbox"/> findings have been raised  <input type="checkbox"/> N/A (for MP)               </td></tr> <tr> <td>2</td><td>Title (of the tool)</td><td>-</td></tr> <tr> <td></td><td>Version</td><td>-</td></tr> <tr> <td></td><td>MP compliance</td><td> <input type="checkbox"/> full compliance  <input type="checkbox"/> findings have been raised  <input type="checkbox"/> N/A               </td></tr> </table>		1	Title (of the tool)	Tool for demonstration and assessment of additionality		Version	7.0.0		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)	-		Version	-		MP compliance	<input type="checkbox"/> full compliance <input type="checkbox"/> findings have been raised <input type="checkbox"/> N/A
1	Title (of the tool)	Tool for demonstration and assessment of additionality																			
	Version	7.0.0																			
	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)	-																			
	Version	-																			
	MP compliance	<input type="checkbox"/> full compliance <input 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: <table border="1"> <tr> <td>1</td><td>Title (of the SB)</td><td>Name of SB</td></tr> <tr> <td></td><td>Version</td><td></td></tr> <tr> <td></td><td>MP compliance</td><td></td></tr> </table>		1	Title (of the SB)	Name of SB		Version			MP compliance										
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	Version																				
	MP compliance																				
	<input type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: -																			
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.																			
		-																			

**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>	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.
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	<p>Further it has been checked whether the GWP for the respective period have 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/, /VER/</li> <li>• /PS/</li> <li>• /VVS/</li> <li>• /unfccc/</li> </ul>
<b>Findings</b>	<input 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.
	<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 checked="" type="checkbox"/> In this context the following CARs, CLs, FARs have been raised: CAR 03: The following issues w.r.t. section D.1 have been identified: <ol style="list-style-type: none"> <li>1. <math>EF_{BL}</math>: Choice of data states that given value for UNC equals 5% which is contradicting with value given under parameter UNC of 3.99. Further that the estimate will be based on QAL2 test to be conducted which have been conducted.</li> <li>2. AFR, <math>CL_{normal}</math>: Choice of data: The section is inconsistent with data as per verification report of first monitoring period as the Baseline value have been recalculated during first verification.</li> <li>3. AFR: Clarify the value 9,094 as it is inconsistent with first verification report which states 9.094.</li> </ol>
<b>Conclusion</b>	<input type="checkbox"/> No CARs/CLs/FARs have been raised in this context. No correction was required. 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>The following values are fixed ex-ante:</p> <p><b>B.1 <math>NCSG_{BC}</math>: 1,630.03 mg/Nm<sup>3</sup></b></p> <p><b>B.2 <math>VSG_{BC}</math>: 72,648 Nm<sup>3</sup>/h</b></p> <p><b>B.3 <math>BE_{BC}</math>: 651.983 tN<sub>2</sub>O;</b></p> <p><b>B.4 <math>OH_{BC}</math>: 4,950 h</b></p> <p><b>B.5 <math>NAP_{BC}</math>: 134,700 tHNO<sub>3</sub></b></p> <p><b>B.6 TSG: n.a. °C</b></p> <p><b>B.7 PSG: n.a. PA (absolute)</b></p> <p><b>B.8 <math>EF_{BL}</math>: 0.004647 tN<sub>2</sub>O / tHNO<sub>3</sub>;</b></p> <p><b>B.9 UNC: 3.99 %</b></p> <p><b>B.10 AFR:</b> Not applicable, monitored data of AFR will be used to determine if plant was operating outside of <math>AFR_{max}</math>.</p> <p><b>B.11 <math>AFR_{max}</math>: 9.094 tNH<sub>3</sub>/h (converted from originally measured Nm<sup>3</sup>/h)</b></p> <p><b>B.12 AIFR:</b> Not applicable, monitored data of AIFR will be used to determine if plant was operating outside of <math>AIFR_{max}</math>.</p> <p><b>B.13 <math>CL_{BL}</math>: 134,700 tHNO<sub>3</sub></b></p> <p><b>B.14 <math>CL_{normal}</math>: 127,302.4 tHNO<sub>3</sub></b></p> <p><b>B. 15 <math>AIFR_{max}</math>: 11.5 %v/v</b></p>

	<p><b>B.16 OT<sub>h</sub>:</b> n.a.</p> <p><b>B.17 OT<sub>normal</sub>:</b> 820 to 905 °C (min and max)</p> <p><b>B.18 OP<sub>h</sub>:</b> n.a. kPa</p> <p><b>B.19 OP<sub>normal</sub>:</b> 365 – 450 kPa (gauge) min and max</p> <p><b>B.20 GS<sub>normal</sub>:</b> W.C. Heraeus Name of Supplier</p> <p><b>B.21 GS<sub>BL</sub>:</b> W.C. Heraeus Name of Supplier</p> <p><b>B.23 GC<sub>normal</sub>:</b> Platinum (Pt) 56.5%; Rhodium (Rh) 3.8%; Palladium (Pd) 39.7%</p> <p>Record of Gauze compositions installed during the historic campaigns:</p> <table border="1"> <thead> <tr> <th rowspan="2">Campaign</th> <th rowspan="2">Gauze Supplier</th> <th colspan="3">Gauze Composition</th> </tr> <tr> <th>Pt (%)</th> <th>Rh (%)</th> <th>Pd (%)</th> </tr> </thead> <tbody> <tr> <td>C10</td> <td>Heraeus</td> <td>58.3</td> <td>3.9</td> <td>37.9</td> </tr> <tr> <td>C12</td> <td>Heraeus</td> <td>56.1</td> <td>3.8</td> <td>40.1</td> </tr> <tr> <td>C13</td> <td>Heraeus</td> <td>56.4</td> <td>3.8</td> <td>39.8</td> </tr> <tr> <td>C14</td> <td>Heraeus</td> <td>56.1</td> <td>3.8</td> <td>40.1</td> </tr> <tr> <td>C15</td> <td>Heraeus</td> <td>55.4</td> <td>3.8</td> <td>40.8</td> </tr> <tr> <td><b>Average</b></td> <td></td> <td><b>56.5</b></td> <td><b>3.8</b></td> <td><b>39.7</b></td> </tr> </tbody> </table> <p><b>B.24 GC<sub>BL</sub>:</b> Platinum (Pt) 56%; Rhodium (Rh) 3.8%; Palladium (Pd) 40.2%</p> <p><b>B.26 EF<sub>reg</sub>:</b> None tN<sub>2</sub>O/tHNO<sub>3</sub></p> <p>Generally the MR and the ER calculation have considered the parameters fixed ex-ante or at the renewal of the crediting period correctly. The values have been crosschecked with the registered PDD, previous verification documents such as MR and verification report as well as further supporting documents e.g. log book. However CAR 03 has been raised and successfully been closed in the course of this verification.</p>	Campaign	Gauze Supplier	Gauze Composition			Pt (%)	Rh (%)	Pd (%)	C10	Heraeus	58.3	3.9	37.9	C12	Heraeus	56.1	3.8	40.1	C13	Heraeus	56.4	3.8	39.8	C14	Heraeus	56.1	3.8	40.1	C15	Heraeus	55.4	3.8	40.8	<b>Average</b>		<b>56.5</b>	<b>3.8</b>	<b>39.7</b>
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<b>Average</b>		<b>56.5</b>	<b>3.8</b>	<b>39.7</b>																																			

### 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>	For details please refer to appendix 5 CAR 04 has been raised.				
<b>Conclusion</b>	<table border="1"> <tr> <td style="width: 50px; text-align: center;"><input type="checkbox"/></td> <td>No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>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.</td> </tr> </table> <p>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.</p>	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.
<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.				

### 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 implemented sampling plan including</p> <ul style="list-style-type: none"> <li>(i) description of the implemented sampling design</li> </ul>
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	(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:		
		-		
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.		
		-		

#### 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 PDD and/or the applicable calibration standards. The results as well as the verification procedure 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/, /TS/.</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 has been duly calibrated for this entire monitoring period.
	<input checked="" type="checkbox"/>	Based on the assessment and information as per appendix 6 delay(s) in calibration have been identified. The PP has applied the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration. From the related calibration certificates and emission reduction calculation the verification team confirms that the maximum permissible

		error has been applied in a conservative manner so that the adjusted measured values due to the delayed calibration result in fewer claimed emission reductions. For details please refer to appendix 6
	<input checked="" type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: - CAR 04, CAR 05 and FAR 01 have been raised.
<b>Conclusion</b>	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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 and 6.
		The installed equipment is either calibrated or related requirements w.r.t. delay of calibration has been applied in conservative manner besides see assessment to related findings raised.

## 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>		During the verification the calculation of baseline GHG emissions has been checked. In detail the following has been verified: <ul style="list-style-type: none"> <li><i>Transparency:</i> It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation 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 monitoring report and the calculation spreadsheet.</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.</li> <li><i>Completeness:</i> It has been checked whether all calculations are complete and without omissions.</li> </ul> The following sources of information have been used in this context: <ul style="list-style-type: none"> <li>/MR/</li> <li>/XLS/.</li> </ul>
<b>Findings</b>	<input checked="" type="checkbox"/>	The calculation of the baseline emissions was found to be fully compliant with the above stated principles. 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 standardized baseline. 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. 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:
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.
		Where corrections were required a revised baseline emissions calculation 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

	baseline calculation is overall correct. The emission reductions are calculated as following: $ER_y = BE_y - PE_y - LE_y$ $ER_y = (EF_{BL} - EF_p) \times NAP \times 10^{-3} \times GWP_{N_2O}$ With $EF_{BL}$ depending on $CL_n$ in comparison to $CL_{normal}$ . For this monitoring period $EF_{BL}$ is		
	<b>Campaign</b>	<b><math>CL_n</math> comparison with <math>CL_{normal}</math> and <math>CL_{BL}</math> if required</b>	<b>EFBL value [tN<sub>2</sub>O/tHNO<sub>3</sub>]</b>
	1. PC15	2. $CL_n > CL_{normal}$	3. 0.0004647
	4. PC16	5. $CL_n > CL_{normal}$	6. 0.0004647
	The plant specific baseline emission factor is calculated as following: $EF_{BL} = (BE_{BC} / NAP_{BC}) \times (1 - UNC/100)$ With determined via: $BE_{BC} = VSG_{BC} \times NCSG_{BC} \times 10^{-9} \times OH_{BC}$		

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

<b>Means of verification</b>	During the verification the calculation of project GHG emissions has been checked. In detail the following has been verified: <ul style="list-style-type: none"> <li>• Transparency: It has been checked whether the calculation of project emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae.</li> <li>• Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet.</li> <li>• Correctness: 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.</li> <li>• Completeness: It has been checked whether all calculations are complete and without omissions.</li> </ul> The following sources of information have been used in this context: <ul style="list-style-type: none"> <li>• /MR/</li> <li>• /XLS/.</li> </ul>	
<b>Findings</b>	<input checked="" type="checkbox"/>	The calculation of the project emissions was found to be fully compliant with the above stated principles. 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 standardized baseline. 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. No errors, miscalculations, omissions, misstatements or incomplete information have been identified.
	<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:
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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. Where corrections were required a revised PE calculation was prepared by the PPs and presented to the verification team. All raised issues were

	<p>addressed appropriately so that it can be confirmed that the baseline calculation is overall correct.</p> <p>The emission reductions are calculated as following:</p> $ER_y = BE_y - PE_y - LE_y$ $ER_y = (EF_{BL} - EF_p) \times NAP \times 10^{-3} \times GWP_{N_2O}$ <p>With <math>EF_p</math> to be determined as following:</p> $EF_p = EF_{ma,n} \text{ if } EF_{ma,n} > EF_n \text{ or } EF_p = EF_n \text{ if } EF_{ma,n} < EF_n$ $EF_{ma,n} = (EF_1 + EF_2 + \dots + EF_n) / n$ $EF_n = PE_n / NAP_n$ $PE_n = VSG \times NCSG \times 10^{-9} \times OH$
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### 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>	<table border="1"> <tr> <td><input checked="" type="checkbox"/></td><td>No leakage emissions were to be considered (LE = 0).</td></tr> <tr> <td><input type="checkbox"/></td><td>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.</td></tr> <tr> <td><input type="checkbox"/></td><td>The verification team has identified mistakes in the project emissions calculation or the underlying calculation approaches.</td></tr> <tr> <td><input type="checkbox"/></td><td>In this context the following CARs, CLs, FARs have been raised:</td></tr> </table>	<input checked="" type="checkbox"/>	No leakage emissions were to be considered (LE = 0).	<input type="checkbox"/>	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.	<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:
<input checked="" type="checkbox"/>	No leakage emissions were to be considered (LE = 0).								
<input type="checkbox"/>	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.								
<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:								
<b>Conclusion</b>	<table border="1"> <tr> <td><input checked="" type="checkbox"/></td><td>No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.</td></tr> <tr> <td><input type="checkbox"/></td><td>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.</td></tr> </table> <p>Where corrections were required a revised LE calculation 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 baseline calculation is overall correct.</p> <p>As per methodology leakage emissions do not have to be considered. Therefore <math>LE_y = 0</math></p>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.				
<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.								

### 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> <li>- Total emission reductions.</li> </ul> <p>It has been assessed whether the values are correct or need to be revised as a consequence of issues identified above.</p>
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<b>Findings</b>	<input checked="" type="checkbox"/>	Section E.4 of the MR includes in a summary table of the emission reductions calculation.															
	<input checked="" type="checkbox"/>	The summary table specified 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 type="checkbox"/>	During the verification issues with impact on the ER calculation have been identified.															
	<input checked="" type="checkbox"/>	In this context the following CARs, CLs, FARs have been raised: CAR 04, CL 03															
<b>Conclusion</b>	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.															
	$ER_y = BE_y - PE_y - LE_y$ $ER_y = (EF_{BL} - EF_p) \times NAP \times 10^{-3} \times GWP_{N_2O}$ $ER_{PC15} = (4.647 - 0.994) \times 138,055 \times 10^{-3} \times 298 \text{ tCO}_2\text{e} = 150,282 \text{ tCO}_2\text{e}$ $ER_{PC16} = (4.647 - 1.136) \times 141,281 \times 10^{-3} \times 298 \text{ tCO}_2\text{e} = 147,827 \text{ tCO}_2\text{e}$ <p>Differences with MR, ER spreadsheet or recalculation by applying stated values are due to rounding or not applying all digits.</p> <p>The emission reductions for this monitoring period covering two campaigns are as following:</p> <table border="1"> <thead> <tr> <th>Campaign</th> <th>Baseline Emissions [tCO<sub>2</sub>e]</th> <th>Project Emissions [tCO<sub>2</sub>e]</th> <th>Emission Reductions [tCO<sub>2</sub>e]</th> </tr> </thead> <tbody> <tr> <td>PC15</td> <td>191,185</td> <td>40,902</td> <td>150,282</td> </tr> <tr> <td>PC16</td> <td>195,652</td> <td>47,825</td> <td>147,827</td> </tr> <tr> <td>Total</td> <td>386,837</td> <td>88,727</td> <td>298,109</td> </tr> </tbody> </table>		Campaign	Baseline Emissions [tCO <sub>2</sub> e]	Project Emissions [tCO <sub>2</sub> e]	Emission Reductions [tCO <sub>2</sub> e]	PC15	191,185	40,902	150,282	PC16	195,652	47,825	147,827	Total	386,837	88,727
Campaign	Baseline Emissions [tCO <sub>2</sub> e]	Project Emissions [tCO <sub>2</sub> e]	Emission Reductions [tCO <sub>2</sub> e]														
PC15	191,185	40,902	150,282														
PC16	195,652	47,825	147,827														
Total	386,837	88,727	298,109														

#### 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 checked="" 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 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:
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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 justification required as the achieved emissions are lower than the ex-ante estimated value.	

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

<b>Means of</b>	On the basis of the above comparison of actual values of the monitoring period
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<b>verification</b>	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:
<b>Conclusion</b>	<input checked="" type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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.
	n.a.	

**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**

<b>Means of verification</b>	The verification team has checked title page as well as chapter E.4 of the MR and the emission reduction calculation sheet /XLS/.										
<b>Findings</b>	<input checked="" type="checkbox"/>	The MR on title page and in section E.4 includes a summary table of the ER breakdown a) ER up to 2012-12-31 and b) ER from 2013-01-01 onwards									
	<input checked="" type="checkbox"/>	The breakdown of the ERs during the first commitment period and from 2013-01-01 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 2013-01-01 onwards, <input type="checkbox"/> The ERs have partly been generated during the first commitment period and partly from 2013-01-01 onwards.									
	<input checked="" type="checkbox"/>	The breakdown of the ERs is correct, considering the applicable guidance.									
	<table border="1"> <thead> <tr> <th></th><th>until 2012-12-31 <sup>1)</sup></th><th>from 2013-01-01 <sup>1)</sup></th><th>Sum</th></tr> </thead> <tbody> <tr> <td>Emission reductions [tCO<sub>2e</sub>]</td><td>-</td><td>298,109</td><td>298,109</td></tr> </tbody> </table>				until 2012-12-31 <sup>1)</sup>	from 2013-01-01 <sup>1)</sup>	Sum	Emission reductions [tCO <sub>2e</sub> ]	-	298,109	298,109
	until 2012-12-31 <sup>1)</sup>	from 2013-01-01 <sup>1)</sup>	Sum								
Emission reductions [tCO <sub>2e</sub> ]	-	298,109	298,109								
	<sup>1)</sup> Both days included										
<b>Conclusion</b>	<input type="checkbox"/>	No CARs/CLs/FARs have been raised in this context. No correction was required. 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 data provided in the MR is correct as well as the related breakdown. No pro-rata approach was required as the entire emission reductions have been achieved after 01/01/2013.										

**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**

AEL mining Services Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 8th periodic verification of the project: "N2O ABATEMENT PROJECT AT NITRIC ACID PLANT NO. 11 AT AFRICAN EXPLOSIVES LTD. (AEL), SOUTH AFRICA", with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to abatement of N2O emissions by a secondary catalyst. This verification covers the period from 23/10/2014 to 05/01/2016 (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 project design document,
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., AM0034 ver. 2,
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately,
- 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.

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

Emission reductions: 298,109 t CO<sub>2e</sub>.

**SECTION H. Certification statement**

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

“N2O ABATEMENT PROJECT AT NITRIC ACID PLANT NO. 11 AT AFRICAN  
EXPLOSIVES LTD. (AEL), SOUTH AFRICA”

registered under

UNFCCC-No. : 1364

has achieved emission reductions in accordance with all applicable requirements for  
registered CDM project activities during the current monitoring period

MP-No.: 8

from: 23/10/2014

to: 05/01/2016

(including both days) as follows:

Emission reductions: 298,109 t CO<sub>2e</sub>.

Essen, 2016-07-07




Stefan Winter  
Team leader

## Appendix 1. Abbreviations

Abbreviations	Full texts
AEL	AEL Mining Services Limited
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO <sub>2</sub>	Carbon dioxide
CO <sub>2eq</sub>	Carbon dioxide equivalent
CL	Clarification Request
DVerR	Draft Verification Report
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IM	Interview Memo
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
XLS	Emission Reduction Calculation Spread Sheet

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



**Statement of Competence**  
Appointment and authorization according to the procedures of the TUV NORD J/CDM 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\_001-VA050-F20\_2015-01-05\_rev4.doc      001-VA050-F20 rev3 / 2012-10-25



**Statement of Competence**  
Appointment and authorization according to the procedures of the TUV NORD J/CDM 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\_001-VA050-F20 rev7 2016-02-09.doc      001-VA050-F20 rev3 / 2012-10-25



**Statement of Competence**  
Appointment and authorization according to the procedures of the TUV NORD J/CDM 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	
13.1	Chemical industry	
13.1	Solid waste and wastewater	

003 – Rev. 9, Date: 2015-05-18

003\_003\_001-VA050-F20\_2015\_05\_18\_rev9.doc      001-VA050-F20 rev3 / 2012-10-25



**Statement of Competence**  
Appointment and authorization according to the procedures of the TUV NORD J/CDM Certification Program

**Mr. Yongjun Li**

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification) Technical Reviewer	2016-06-26
VCS / ISO 14064-2	Lead Assessor (Validation, Verification) Technical Reviewer	2016-06-26

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables

039 – Rev. 3, Date: 2015-01-06

039\_001-VA050-F20\_2015-01-06\_rev3.doc      001-VA050-F20 rev3 / 2012-10-25

### Appendix 3. Documents reviewed or referenced

No.	Author	Reference	Title	References to the document	Provider
1	UNFCCC	<b>/AM34/</b>	ACM0034 "Catalytic reduction of N <sub>2</sub> O inside the ammonia burner of nitric acid plants", version 2		Other
2	DOE	<b>/CPM/</b>	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)		Other
3	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	<a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a>	Other
4	UNFCCC	<b>/KPI/</b>	Kyoto Protocol (1997)	<a href="http://unfccc.int/kyoto_protocol/items/2830.php">http://unfccc.int/kyoto_protocol/items/2830.php</a>	Other
5	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
6	PP	<b>/MR/</b>	Monitoring Report for CDM project: "N <sub>2</sub> O ABATEMENT PROJECT AT NITRIC ACID PLANT NO. 11 AT AFRICAN EXPLOSIVES LTD. (AEL), SOUTH AFRICA" version 1, dated 18/02/2016 Monitoring Report for CDM project: "N <sub>2</sub> O ABATEMENT PROJECT AT NITRIC ACID PLANT NO. 11 AT AFRICAN EXPLOSIVES LTD. (AEL), SOUTH AFRICA" version 03, dated 10/06/2016		Other
7	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
8	UNFCCC	<b>/PDD/</b>	Project Design Document for CDM project: "N <sub>2</sub> O ABATEMENT PROJECT AT NITRIC ACID PLANT NO. 11 AT AFRICAN EXPLOSIVES LTD. (AEL), SOUTH AFRICA" version 1.c, dated 25/09/2007		Other
9	UNFCCC	<b>/PS/</b>	CDM Project Standard (Version 9.0)	<a href="http://cdm.unfccc.int/Reference/Standards/index.html">http://cdm.unfccc.int/Reference/Standards/index.html</a>	Other
10	PP	<b>/VAL/</b>	Validation Report for CDM project "N <sub>2</sub> O abatement project at nitric acid plant No. 11 at African Explosives Ltd. (AEL), South Africa" version 1,		Other

			dated 27/09/2007		
11	PP	<b>/VER/</b>	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)		Other
12	UNFCCC	<b>/VVS/</b>	CDM Validation and Verification Standard (Version 09.0)	<a href="http://cdm.unfccc.int/Reference/Standards/index.html">http://cdm.unfccc.int/Reference/Standards/index.html</a>	Other
13	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)	<a href="https://cdm.unfccc.int/Reference/Guidclarif/index.html">https://cdm.unfccc.int/Reference/Guidclarif/index.html</a> <a href="http://cdm.unfccc.int/Reference/Standards/index.html">http://cdm.unfccc.int/Reference/Standards/index.html</a>	Other
14	UNFCCC	<b>/TA/</b>	<ul style="list-style-type: none"> <li>• Tool to calculate baseline, project and/or leakage emissions from electricity consumption Version 1</li> <li>• Tool to calculate the emission factor for an electricity system Version 4.0</li> <li>• Tool to determine the mass flow of a greenhouse gas in a gaseous stream Version 2.0.0</li> <li>• Upstream leakage emissions associated with fossil fuel use Version 2.0</li> </ul>	<a href="http://cdm.unfccc.int/Reference/tools/index.html">http://cdm.unfccc.int/Reference/tools/index.html</a>	Other
15	UNFCCC	<b>/GOT/</b>	Glossary “CDM terms” (version 08.0)	<a href="https://cdm.unfccc.int/filestorage/e/x/t/extfile-20150226124447549-glos_CDM.pdf/glos_CDM.pdf?t=UmZ8bnFjODI3fDCW9A3vJwR03kQQh4sbLiYu">https://cdm.unfccc.int/filestorage/e/x/t/extfile-20150226124447549-glos_CDM.pdf/glos_CDM.pdf?t=UmZ8bnFjODI3fDCW9A3vJwR03kQQh4sbLiYu</a>	Other
16	Müller-BBM GmbH	<b>/AST/</b>	Report for AST (03/07/2012 – 04/07/2012) issued by Müller-BBM GmbH, Report Nr: M100097/02 dated 08/08/2012 Report for AST (07/08/2013 and 22/10/2013 – 24/10/2013) issued by Müller-BBM GmbH, Report Nr: M106390/02 dated 13/02/2014 Report for AST (01/03/2016 – 02/03/2016) issued by Müller-BBM GmbH, Report Nr: M124040/02 dated 21/03/2016		PP
17	PP	<b>/BR/</b>	Breakdown reports		PP
18	PP, supplier	<b>/CAL/</b>	<ul style="list-style-type: none"> <li>• Calibration procedures</li> <li>• Calibration certificates and documentation done by supplier</li> <li>• Calibration certificates from day-to-day checks/calibrations and documentation done by AEL</li> <li>• Tax invoice for E+H differential pressure flow meter</li> </ul>		PP

			<ul style="list-style-type: none"> <li>Tax invoice for new ABB sampler</li> </ul>		
19	Linde Group	<b>/CoC/</b>	Certificate of Conformance for Test Gases: N <sub>2</sub> O, Nitrogen (zero and span gas)		PP
20	PP	<b>/FSNA/</b>	Flow Sheet Nitric Acid Plant		PP
21	<b>PP SABS</b>	<b>/ISO/</b>	<ul style="list-style-type: none"> <li>ISO 9001:2008 certificate for "The design, manufacture and supply of ANFO explosives (ammonium nitrate fuel oil), powergel emulsion explosives and energan bulk explosives",</li> <li>ISO 14001:2004 certificate for "The manufacture, sale and distribution of fertilizer and related products".</li> <li>Related procedures of the Quality Management System handbook esp. those with respect to the project activity <ul style="list-style-type: none"> <li>- CSQMS0014: Calibration and Maintenance</li> <li>- CSQMS0018: Supplier quality assurance</li> <li>- CSHR0003: Process operations: Education, Training and Development</li> </ul> </li> <li>List of local standards in South Africa</li> </ul>	<a href="https://www.sabs.co.za/Business_Units/Standards_SA/SABSTAN/STANDARDS_DEVELOPMENT/Published_Standards/PS070.PDF">https://www.sabs.co.za/Business_Units/Standards_SA/SABSTAN/STANDARDS_DEVELOPMENT/Published_Standards/PS070.PDF</a>	PP
22	7. PP	<b>/LOG/</b>	Record log sheet of operator including main operation data and HNO <sub>3</sub> temperature and density taken by manual measurement and concentration.		PP
23	8. PP	<b>/NATGAS/</b>	Gas Composition Specification for calibration gas for NO, NO <sub>x</sub> and N <sub>2</sub> O		PP
24		<b>/OCS/</b>	Actual operating condition values of the N <sub>2</sub> O destruction facility during the on-site visit. DCS printout on nitric acid concentration calculation by the DCS system		PP
25	9. PP	<b>/P&amp;I/</b>	P&I Diagram		PP
26	10. PP	<b>/PPT/</b>	Presentation of the company AEL Mining Services Ltd. and production facilities		PP
27	11. PP	<b>/PROD/</b>	Production data for the period October 2014 to January 2016 on monthly basis Nitrates balance for year 2014 and 2015		PP
28	TÜV SÜD	<b>/QAL1/</b>	Suitability testing report by TÜV SÜD, Germany, report no. 2410 6657 and 170 608 dated June 2006		PP
29	Müller-BBM GmbH	<b>/QAL2/</b>	Report for QAL2 test (22/06/2011 – 25/06/2011) issued by Müller-BBM GmbH, Report Nr: M92 321/2 , dated 30/09/2011 Report for QAL2 test (23/09/2014 – 25/09/2014) issued by Müller-BBM		PP

			GmbH, Report Nr: M114144/02 , dated 08/12/2014		
30	PP	/QAL3/	Daily and Monthly Check log sheets for the Emerson N <sub>2</sub> O analysers		PP
31	12. PP	/RAW/	Raw data: Hourly and monthly summarized data from AMS Technical Managers log spreadsheet		PP
32	13. PP	/Train/	Training protocols for the operation of the Monitoring System esp. the Analyser.		PP
33	14. PP	/TS/	Technical data sheets of installed monitoring equipment		PP
34	15. PP	/XLS/	Initial emission reduction calculation spreadsheet ver02		PP

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

**Table 3. Remaining FAR from validation and/or previous verification**

<b>FAR ID</b>	01	<b>Section no.</b>	General, D.2	<b>Date:</b> 16/03/2016
<b>Description of FAR</b>				
During onsite check it has been identified that the time in the AMS computer recording is wrongly set. At 12 o'clock it showed 8:09 am the same day. Clarification is requested w.r.t. the impact on the emission reduction calculation.				
<b>Project participant response (1<sup>st</sup> round)</b>				<b>Date:</b> From last report
The AMS computer (SCADA system) is supposed to synchronise with the DCS of plant No9 but didn't. The computer has been sent to the vendor to identify and resolve the issue. They identified a software problem and resolved it. The problem affects only the time stamp and not the data used for the emission reduction calculation. Hence, it doesn't affect the calculation. It can be checked during the next verification that the time stamp has been corrected.				
<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 checked="" type="checkbox"/>	Other: Site inspection and interview			
<b>DOE assessment (1<sup>st</sup> round)</b>				<b>Date:</b> 15-16/03/2016
DOE during site inspection checked the AMS computer. The AMS computer has been replaced in May 2015 to SIMATIC PACK PC. From check of the PC itself it can be confirmed that the given date and time is now correct. Further this had no implication to the emission reductions for this monitoring period as the exchange was done during gauge change and the period until the change are correct recorded even though the date in the PC was wrong the date in the overall DCS was 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 4. CL from this verification**

<b>CL ID</b>	01	<b>Section no.</b>	C	<b>Date:</b> 16/03/2016
<b>Description of CL</b>				
Clarification and specification is requested w.r.t. date when AMS computer failed and has been replaced even though the back-up system was in place and data was therefore recorded.				
<b>Project participant response (1<sup>st</sup> round)</b>				<b>Date:</b> 10/06/2016
<i>AEL operates two AMS computers. The data from both plants is stored on both PCs. The PC in the Control room failed on 14/05/2015 and was replaced on 07/06/2015. The PC in the analyzer room of AEL9 failed on 11/06/2015 and was replaced on 14/06/2015. There was at least one of the PCs operating at all times.</i>				
<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): C	New version No.: 2	
<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> 22/06/2016
Ok. Related clarification has been provided which has been confirmed during interview with personnel during onsite inspection. Besides the emission reduction spreadsheet has been checked and data was available and could be crosschecked already onsite.				
<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>CL ID</b>	02	<b>Section no.</b>	E.1	<b>Date:</b> 16/03/2016
<b>Description of CL</b>				
Clarify the values 0,115 and 11,5% (use of comma and dot).				
<b>Project participant response (1<sup>st</sup> round)</b>				<b>Date:</b> 11/04/2016
<i>The correct values are 0.115 and 11.5%. The monitoring report has been updated accordingly.</i>				
<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): E.1	New version No.: 2	
<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> 11/05/2016
Ok. Related revision in MR has been conducted. BY check of updated MR it can be confirmed that values apply dot and comma correctly.				
<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>CL ID</b>	03	<b>Section no.</b>	ER calculation	<b>Date:</b> 16/03/2016
<b>Description of CL</b>				
Clarification is requested why for example on 12/10/2015 9:00 to 20:00 or 18 and 19/08/2015 the plant is considered offline as per MR and no values are given in ER calculation spreadsheet but a NAP production of 706 t or 710t and 699 t is given for this day. Further check other similar cases in ER calc and clarify any impact on ER calculation and result.				
<b>Project participant response (1<sup>st</sup> round)</b>				<b>Date:</b> 11/04/2016

No data was recorded several times during the monitoring period (please see list below). Some of these events were mistakenly reported as "plant considered offline" due to the fact that operating temperature was not recorded and thus lower than 820°C. During the verification it became evident, that the plant was operating and nitric acid was produced in those times. Hence, the plant wasn't considered offline and instead, replacement values have been used for NCSG and/or VSG in accordance with the methodology. The list below shows all the times the plant was previously considered offline and now replacement values have been used instead. The MR and the Emission Reduction Calculation have been updated accordingly.

PC15	31/10/2014 12:00	31/10/2014 23:00	406.51 85,024.49	NCSG VSG
PC15	02/01/2015 00:00	02/01/2015 23:00	406.51 85,024.49	NCSG VSG
PC15	27/02/2015 09:00	28/02/2015 23:00	85,024.49	VSG
PC15	06/03/2015 13:00	09/03/2015 10:00	85,024.49	VSG
PC15	20/04/2015 02:00	20/04/2015 02:00	85,024.49	VSG
PC15	22/04/2015 10:00	22/04/2015 10:00	85,024.49	VSG
PC15	30/04/2015 03:00	30/04/2015 03:00	85,024.49	VSG
PC16	04/06/2015 11:00	05/06/2015 23:00	88,245.04	VSG
PC16	01/08/2015 00:00	01/08/2015 23:00	88,245.04	VSG
PC16	11/08/2015 11:00	14/08/2015 11:00	88,245.04	VSG
PC16	18/08/2015 17:00	19/08/2015 14:00	88,245.04	VSG
PC16	31/08/2015 09:00	31/08/2015 23:00	88,245.04	VSG
PC16	12/10/2015 09:00	12/10/2015 23:00	88,245.04	VSG

**Documentation provided by project participant (1<sup>st</sup> round)**

<input type="checkbox"/> Changes in the PDD	Section(s):	New version No.:
<input checked="" type="checkbox"/> Changes in MR	Section(s): C, D.2, E.2	New version No.: 2
<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): PC15 data, PC16 data, Calculations PC15 Calculations PC16, Summary MP8	New version No.: 2
<input type="checkbox"/> Other:		

**DOE assessment (1<sup>st</sup> round)**
**Date: 11/05/2016**

Ok. Related explanation has been provided. As per methodology in case of downtime the following is to be applied:

"In the event that the monitoring system is down, the lowest between the conservative IPCC (4.5 kg N<sub>2</sub>O/ton nitric acid) or the last measured value will be valid and applied for the downtime period for the baseline emission factor, and the highest measured value in the campaign will be applied for the downtime period for the campaign emission factor."

The none monitoring of the temperature is considered a partly downtime of the monitoring system. Due to this the related requirement as per methodology has been applied by applying highest measured value during the campaign for the emission factor /N<sub>2</sub>O concentration in the stack gas and the stack gas volume. This is considered in line with the methodology as well as conservative as leads to higher project emissions.

DOE further checked the updated ER calculation to confirm that the method described has been applied for the given time periods. The time periods as well as that the system was operating even though the temp value has been not recorded has been crosschecked during onsite inspection with breakdown report<sup>/BR/</sup> as well as record log sheets of the operator<sup>/LOG/</sup> and DCS print outs<sup>/OCS/</sup> and finally the production data<sup>/PROD/</sup>.

Based on that the above stated time periods are correct as well as that during this time the plant was in production and the requirement as per methodology is applied correctly.

**Conclusion**
*Tick the appropriate checkbox*

- ☐ Additional action should be taken (finding remains open)  
☒ The finding is closed

Table 5. CAR from this verification

<b>CAR ID</b>	01	<b>Section no.</b>	B.1	<b>Date:</b> 16/03/2016
<b>Description of CAR</b>				
<p>Following issues w.r.t. downtime list in B.1 have been identified:</p> <ol style="list-style-type: none"> <li>1. As per check with ER calculation the period 17/12/2014 to 17/12/2015 in MR is not consistent please clarify and revise accordingly.</li> <li>2. For the period 11/08/2015 to 14/08/2015 and 18/08/2015 to 19/08/2015 it is stated that the reason for downtime is No data recording, plant considered offline. As per onsite interview with personnel the reason is due to network failure. Revision requested.</li> <li>3. The end date for the period when N2O Analyzer failed given as 14/08/2015 to 05/01/2015 is not reasonable and correct as per data check and interviews during site visit.</li> <li>4. Further as per onsite visit and interview with personnel the reason for "N2O analyzer failed" is not correct. The analyzer itself was working well as per QAL3 tests however no samples have been analyzed even though the analyzer was ok. The reason for none values are to be specified.</li> <li>5. The list provides two dates at the end of 04/01/2015 and 05/01/2015 which are not reasonable considering the end date of the monitoring period 05/01/2016. Revision requested.</li> </ol>				
<b>Project participant response (1<sup>st</sup> round)</b>				
<ol style="list-style-type: none"> <li>1. The correct period is 17/12/2014 10:00 to 17/12/2014 19:00. The typo has been corrected in the monitoring report.</li> <li>2. The data from 11/08/2015 to 14/08/2015 and 18/08/2015 to 19/08/2015 has been lost due to a power network failure in the equipment room. The plant was operating at this time. The AMS was down, and the procedure for replacement values has been applied in accordance with the methodology. The monitoring report and the ER calculation have been updated to reflect this correction.</li> <li>3. The end date for the period when N2O Analyzer didn't report correct data was 05/01/2016 and not 05/01/2015. The typo has been corrected in the monitoring report.</li> <li>4. The N2O analyzer was working well as documented by QAL3 tests. Instead, the analyser pump was broken. The pump takes the sample to be analysed to the analyser. Due to the faulty pump no samples could be analysed. The invoice for the repair has been submitted to the DOE<sup>/CAL/</sup>.</li> <li>5. The typo has been corrected in the monitoring report. The correct dates are 04/01/2016 and 05/01/2016.</li> </ol>				
<b>Documentation provided by project participant (1<sup>st</sup> round)</b>				<b>Date:</b> 11/04/2016
<input type="checkbox"/>	Changes in the PDD	Section(s):	New version No.:	
<input checked="" type="checkbox"/>	Changes in MR	Section(s): B.1	New version No.: 2	
<input type="checkbox"/>	Changes in XLS	Worksheet(s):	New version No.:	
<input checked="" type="checkbox"/>	Other: Tax invoice sampler			
<b>DOE assessment (1<sup>st</sup> round)</b>				<b>Date:</b> 11/05/2016
<ol style="list-style-type: none"> <li>1. Ok. The time period has been corrected in line with related ER spreadsheet and as checked with underlying raw data<sup>/RAW/</sup>.</li> <li>2. Ok. MR has been updated w.r.t. related reason for the periods. Further as per check of ER calculation the related requirement as per methodology to apply highest values for NCSG and VSG has been correctly conducted.</li> <li>3. Ok. The date has been revised correctly as per document check and onsite inspection.</li> <li>4. Ok. The reason has been corrected as identified during onsite inspection.</li> <li>5. Ok. The dates have been corrected.</li> </ol>				
<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>	02	<b>Section no.</b>	C	<b>Date:</b> 16/03/2016
<b>Description of CAR</b>				
<p>As per check of latest ISO certificates the stated independent third party SABS has not conducted the audits and issued the latest ISO 9001 and ISO 140001 certificates but DQS. Correction requested.</p>				
<b>Project participant response (1<sup>st</sup> round)</b>				
<p><i>The monitoring report has been updated to reflect the situation.</i></p>				

<b>Documentation provided by project participant (1<sup>st</sup> round)</b>		<b>Date:</b> 11/04/2016	
<input type="checkbox"/>	Changes in the PDD	Section(s):	New version No.:
<input checked="" type="checkbox"/>	Changes in MR	Section(s): C	New version No.: 2
<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> 11/05/2016	
Not ok. Section C under point 7 has been updated accordingly however under point 9 reference is still made to "The South African Bureau of Standards (SABS) is the designated auditor for these standards at AEL". SABS is not the auditor but DQS. Further revision requested.			
<b>Project participant response (2<sup>nd</sup> round)</b>			
Point 9 of the monitoring report has been updated to reflect the situation.			
<b>Documentation provided by project participant (2nd round)</b>		<b>Date:</b> 10/06/2016	
<input type="checkbox"/>	Changes in the PDD	Section(s):	New version No.:
<input checked="" type="checkbox"/>	Changes in MR	Section(s): C	New version No.: 3
<input type="checkbox"/>	Changes in XLS	Worksheet(s):	New version No.:
<input type="checkbox"/>	Other:		
<b>DOE assessment (2<sup>nd</sup> round)</b>		<b>Date:</b> 22/06/2016	
Ok. The specification of an accredited entity has been revised to the general term "by an independent firm accredited for ISO9001/140001". Therefore this issue is closed.			
<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>	03	<b>Section no.</b>	D.1	<b>Date:</b>	16/03/2016
<b>Description of CAR</b>					
The following issues w.r.t. section D.1 have been identified:					
<ol style="list-style-type: none"> <li>1. <math>EF_{BL}</math>: Choice of data states that given value for UNC equals 5% which is contradicting with value given under parameter UNC of 3.99. Further that the estimate will be based on QAL2 test to be conducted which have been conducted.</li> <li>2. AFR, <math>CL_{normal}</math>: Choice of data: The section is inconsistent with data as per verification report of first monitoring period as the Baseline value have been recalculated during first verification.</li> <li>3. AFR: Clarify the value 9,094 as it is inconsistent with first verification report which states 9.094.</li> </ol>					
<b>Project participant response (1<sup>st</sup> round)</b>					
<ol style="list-style-type: none"> <li>1. <math>EF_{BL}</math>: The correct uncertainty value is 3.99% as stated in B.9. The misleading sentence has been deleted from the monitoring report.</li> <li>2. AFR, <math>CL_{normal}</math>: Choice of data: The section has been updated to reflect the values and descriptions for the actual baseline campaign in line with the first verification report.</li> <li>3. AFR: The correct value is 9.094 and the typo has been corrected.</li> </ol>					
<b>Documentation provided by project participant (1<sup>st</sup> round)</b>				<b>Date:</b> 11/04/2016	
<input type="checkbox"/>	Changes in the PDD	Section(s):	New version No.:		
<input checked="" type="checkbox"/>	Changes in MR	Section(s): D.1	New version No.: 2		
<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> 11/05/2016	
<ol style="list-style-type: none"> <li>1. Ok. As sentence has been deleted and information provided under parameter B.9 UNC.</li> <li>2. Ok. The data has been updated in line with the first verification report.</li> <li>3. Ok. The value has been corrected accordingly.</li> </ol>					
<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>	04	<b>Section no.</b>	D.2	<b>Date:</b>	16/03/2016
<b>Description of CAR</b>					

The following issues w.r.t. section D.2 have been identified:

1. For the parameters NCSG, VSG, TSG and PSG the following is identified:
  - a. It is stated that the AST is overdue and has not been conducted, however the AST onsite inspection has been conducted from 01/03-03/03/2016.
  - b. Delay in calibration has been identified for the parameters as the AST has not been conducted in time from 23/09/2015 to 05/01/2016. The maximum permissible error has been applied correctly for this time period in the ER calculations however the AST report is still pending and it is therefore not possible to confirm that the actual result of the test is without any issues which could have influence on the accuracy of the measurement equipment. The AST has therefore to be provided.
  - c. Further due to the delay in calibration it is referenced to VVS §273. However as per latest VVS this is not consistent.
  - d. Specification is requested w.r.t. the reason for analyzer downtime or non measurement
  - e. It is stated that the analyzer was down on 16/01/2016 however as per onsite interview this is not correct.
2. OTh: The thermocouples will be replaced by new once each campaign. Due to this the serial number given is from campaign 14. Revision is requested and the serial numbers for PC 15 and PC 16 are missing.
3. OTh and OPh: The calibration certificate and dates in the MR for period late 2014 to beginning 2015 are missing.
4. AFR and AIFR: The calibration dates given are not covering this entire monitoring period and the first date is before this monitoring period.
5. AIFR: The MR refers to a Yokogawa measurement equipment however as per site visit an E+H equipment is installed. Therefore specification is requested when the equipment was replaced, the correct serial numbers are missing.

**Project participant response (1<sup>st</sup> round)**

1. For the parameters NCSG, VSG, TSG and PSG the following is clarified:
  - a. The AST has been conducted from 01/03-02/03/2016 and the monitoring report has been updated accordingly.
  - b. Delay in calibration has been identified for the parameters as the AST has not been conducted in time from 23/09/2015 to 05/01/2016. The maximum permissible error has been applied correctly for this time period in the ER calculations. The AST has taken place and confirmed that the actual result of the test is without any issues. The AST report has been provided.
  - c. The monitoring report has been updated and now references to VVS §395.
  - d. The reason for the non-measurement was the faulty analyzer pump and not the analyzer itself.
  - e. The correct data for the start of the period of non-measurement was 16/01/2015 and not 16/01/2016. This typo has been corrected in the monitoring report.
2. OTh: The thermocouples will be replaced by new once each campaign. The thermocouples are returned to the manufacturer after their use. The serial numbers have not been recorded by AEL and are not available.
3. OTh and OPh:
 

OTh

  - The thermocouples are calibrated by the supplier and not internally by AEL. AEL has no record of the calibration certificates. The manufacturer has not been able to provide the requested certificates retrospectively. The installation dates of the thermocouples are 23/10/2014, 29/05/2015

OPh

  - The missing calibration date is 24/10/2014 and the calibration certificate has been provided to the DOE. The MR has been updated.
4. AFR and AIFR: The MR has been updated with the correct dates.
 

AFR

  - The calibration dates covering the entire monitoring period are 02/04/2014, 04/12/2014, 25/05/2015, 11/11/2015.

AIFR:

  - The calibration dates covering the entire monitoring period for AIFR are 02/04/2014, 25/05/2015, 11/11/2015. The new Endress & Hauser device was delivered on 03/12/2014. It was calibrated by the supplier and installed on the 28/12/2014.
5. AIFR: The Yokogawa measurement equipment has been replaced by an Endress and Hauser Deltabar S on 28/12/2014 due to malfunction of its diaphragm. The serial number of the new device is JA08710109D and the overall measurement accuracy is 1.25%. The MR has been updated to reflect the current situation.

Documentation provided by project participant (1 <sup>st</sup> round)		Date: 11/04/2016
<input type="checkbox"/> Changes in the PDD	Section(s):	New version No.:
<input checked="" type="checkbox"/> Changes in MR	Section(s): D.2	New version No.: 2
<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
<input checked="" type="checkbox"/> Other: AST report, CSM0018		
DOE assessment (1 <sup>st</sup> round)		Date: 10/06/2016

<ol style="list-style-type: none"> <li>1. For the parameters NCSG, VSG, TSG and PSG the following is clarified:               <ol style="list-style-type: none"> <li>a. Ok. The MR has been revised accordingly and now states that the respective AST has been conducted on 01/03/2016 which is checked with related AST report<sup>/AST/</sup></li> <li>b. Ok. Related AST from March 2016 has been provided which confirms that the monitoring equipment is operating within maximum permissible limits and the application of the maximum permissible limit for the delayed calibration period is therefore correct<sup>/AST/</sup>.</li> <li>c. Ok. MR has been updated and description refers now to correct \$395 of VVS.</li> <li>d. Ok. MR has been updated to provide the correct reason for downtime as identified during onsite inspection.</li> <li>e. Ok. The MR has been corrected accordingly.</li> </ol> </li> <li>2. OTh: Ok. As the thermocouples have been returned to the manufacturer related information cannot be retained. In order to record related information the procedure CSQMS0018 Supplier quality assurance has been revised on 31/05/2016 to include the following:               <ol style="list-style-type: none"> <li>a. 6.4.3 Internal verification of inbound material shall occur on arrival at the storage location as per the requirements of the SOA. Store personnel shall inform SQA of arrival.</li> <li>b. 6.4.4 All quality documentation (COC/COA/Test Results) shall be collected in a centrally accessible storage repository (Edge) along with the material details to ensure traceability.</li> </ol> </li> <li>3. OTh/OPh                OTh: Ok. As per AEL procedure and as already stated in verification report of previous monitoring period the thermocouples are renewed at each gauze change. All new purchased thermocouples are manufacturer calibrated as per sectoral knowledge and experience by the verification team besides confirmation by the manufacturer.                OPh: Ok. The missing certificate has been provided.             </li> <li>4. AFR and AIFR: Ok. The MR has been updated accordingly and provides now all dates of calibration which cover this entire monitoring period. Related calibration certificates have been checked to confirm the same. Besides the equipment is factory calibrated at time of installation which is confirmed on sectoral knowledge and experience by verification team as well as check of tax invoice when equipment was delivered to ensure that it was installed closely after delivery and not stored for long time.</li> <li>5. AIFR: Ok. The MR has been updated accordingly in line with data and information found during site visit inspection.</li> </ol>	
<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>	05	<b>Section no.</b>		<b>Date:</b> 16/03/2016
<b>Description of CAR</b>				
The following documents are to be provided: <ol style="list-style-type: none"> <li>1. The internal calibrations conducted for VSG, TSG and PSG after PC14 (late 2014) and PC15 (2015)</li> <li>2. Calibration certificate for the span gas (empty bottle at site)</li> <li>3. AST report from March 2016</li> </ol>				
<b>Project participant response (1<sup>st</sup> round)</b>				
<ol style="list-style-type: none"> <li>1. The certificates for the internal calibrations conducted for VSG, TSG and PSG after PC14 (late 2014) and PC15 (26/05/2016) have been submitted to the DOE.</li> <li>2. The related calibration certificate cannot be made available any more. The AST report from March 2016 has been submitted to the DOE.</li> <li>3. The AST report from March 2016 has been submitted to the DOE.</li> </ol>				
<b>Documentation provided by project participant (1<sup>st</sup> round)</b>				<b>Date:</b> 10/06/2016
<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 checked="" type="checkbox"/>	Other: Requested report and certificates			
<b>DOE assessment (1<sup>st</sup> round)</b>				<b>Date:</b> 22/06/2016

1. Ok. The related internal quality assurance and calibration checks have been provided now. 2. Ok. The calibration certificate of the span gas could not be made available. The DOE closed the issue due to the reason that the related manufacturer is well known for high quality products (Linde Group). Besides the manufacturer of the span gas has also a certified quality management system and therefore DOE considers that the quality of the gas is a per expectations and requirements. Further the quality management system of the PP has been updated, to ensure that no span gas is accepted at delivery without calibration certificate and after delivery a copy of the same will be forwarded to the technical manager for recording. Specifically CSQMS0018 Supplier quality assurance includes now a. 6.4.3 Internal verification of inbound material shall occur on arrival at the storage location as per the requirements of the SOA. Store personnel shall inform SQA of arrival. b. 6.4.4 All quality documentation (COC/COA/Test Results) shall be collected in a centrally accessible storage repository (Edge) along with the material details to ensure traceability. Further this has no direct impact on the emission reductions as the span gas is used to crosscheck a monitoring equipment and all crosschecks verified shown no deficiency during entire period. The measurement equipment has to be calibrated annually via AST and every 5 years by QAL. The related AST has been conducted even though the latest in march. The equipment passed also the latest AST. Therefore DOE considers the non availability of the calibration certificate as not significant. 3. Ok. Has been provided.	
<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 6. FAR from this verification

<b>FAR ID</b>	01	<b>Section No.</b>	E	<b>Date:</b> 16/03/2016
<b>Description of FAR</b>				
FAR is raised as there is delay in calibration due to delayed AST from 23/09/2015 to 01/03/2016 however the monitoring period ends 05/01/2016 and there is remaining delay in calibration from 06/01/2016 to 01/03/2016 which is to be considered during next monitoring period and verification.				
<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):	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</b>				<b>Date:</b> DD/MM/YYYY
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>				
<input checked="" type="checkbox"/> To be checked during the next periodic verification				

<b>FAR ID</b>	02	<b>Section No.</b>	C, D.2	<b>Date:</b> 16/03/2016
<b>Description of FAR</b>				
As per interview with EDTP (Education Development Training Practizener) currently only one person is qualified for maintenance and calibration (QAL3) on the N2O analyzer. It is to be checked during next verification that at least one more person is qualified to ensure that QAL3 is conducted in case of holiday, illness etc of the first person.				
<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):	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</b>		<b>Date:</b> DD/MM/YYYY
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input checked="" type="checkbox"/> To be checked during the next periodic verification	

<b>FAR ID</b>	03	<b>Section No.</b>	PDD	<b>Date:</b> 16/03/2016
<b>Description of FAR</b>				
<p>As per related methodology the baseline for the project activity has to be established through continuous monitoring for one complete campaign prior to project implementation. This has been done by the PP correctly and the related values have verified during the first subsequent periodic verification of the project activity<sup>VER/</sup>. As the current latest PDD on the corresponding UNFCCC project webpage was finished prior to commencement of the baseline campaign the values for the baseline campaign shown in the latest PDD are not as per results of the baseline campaign received. These values are to be found in the related verification report of the first periodic verification.</p> <p>Therefore this FAR has been raised in order to revise the PDD to correct the related values as per results of the baseline campaign and as stated in the verification report of the first periodic verification.</p>				
<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):	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</b>				<b>Date:</b> DD/MM/YYYY
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input checked="" 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. NCSG</b>		N2O concentration in the stack gas during each project campaign		
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b>  <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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>	<p>/IM01/  /PDD/  /AM34/  /MR/  /AST/  /QAL1/  /QAL2/  /RAW/</p>	<p>Description: The N2O concentration is measured by continuous gas analyzer ABB AO2040 URAS 14. The analyzer is part of an automated monitoring system which is in line with standard EN 14181.</p> <p>The gas analyzer is connected to the AMS which automatically records the values every 2 seconds. The AMS also generates hourly data from the 2-sec data. The files are saved month-wise.</p> <p>Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to n.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS.</p> <p>The monitoring equipment has been checked physically during onsite visit. Besides interview with personnel has been conducted.</p> <p>Conclusion: The monitoring procedure is as per reg PDD.</p>	<p><b>CAR 04</b>  <b>CAR 05</b></p>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		However CAR 04 and CAR 05 have been raised.		
<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 Annex 2.</i></p>	<p>/IM01/ /PDD/ /AM34/ /MR/ /AST/ /QAL1/ /QAL2/ /RAW/ /CAL/ /CoC/ /NATGAS/</p>	<p>Description: AM0034 requires all key meters for the N2O determination to be subject to a quality control regime that will include regular maintenance and calibration according to the European Norm EN 14181. The analyzer has a QAL1 approval. The QAL 2 has been performed on 22/06/2012 to 25/06/2012 and 23/09/2014 to 25/09/2014 by Müller-BBM GmbH. The AST according to EN 14181 was performed on 03/07/2012 to 04/07/2012 and 06/08/2013 and 22/10/2013 to 24/10/2013 also by Müller-BBM GmbH as well as from 01/03/2016 to 02/03/2016 again by Müller-BBM GmbH.</p> <p>As per latest QAL2 report the overall measurement accuracy is 1.60%</p> <p>Verifier's action:</p> <p>The measured N2O concentration values were checked during on-site visit, by means of data comparison tests, interviews and observations. Raw data, data from AMS, the ER calculation spreadsheet as well as QA/QC documentation has been checked. Furthermore the calibration procedures under QAL 3 and certificates of used span and zero gases have been analyzed.</p> <p>Conclusion:</p> <p>Numerous QA/QC checks are implemented and foreseen, such as:</p> <ul style="list-style-type: none"> <li>- EN 14181 compliance (QAL 1 to QAL 3, AST) including check of analytical function (zero and span check)</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>Based on the above the monitoring system is duly calibrated.</p>	<p><del>CAR</del> <b>04</b> <del>CAR</del> <b>05</b></p>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		Besides delay in calibration, delay of conducting AST, has been identified for the periods 23/09/2015 – 05/01/2016. Related provisions as per VVS §395 have been applied by considering the maximum permissible error for the stated periods, meaning leading to higher project emissions. Nevertheless CAR 04 has been raised.		
<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/ /RAW/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: For PC15: 361.87 mg/Nm. For PC16: 408.37 mg/Nm³. Verifier's action: By means of checking ER spreadsheet against monthly data as well as hourly raw data. Conclusion: No mistake has been identified however CAR 04 has been raised.	<b>CAR 04</b>	Ok
<b>B. VSG</b>		Normal gas volume flow rate of the stack gas during each project campaign		
<b>a) Measurement / Determination method (VVS, §§ 389-393)</b> <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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>	/IM01/ /PDD/ /AM34/ /MR/ /AST/ /QAL1/ /QAL2/ /RAW/	Description: The normal gas volume flow of the stack gas during the campaign on a dry basis is monitored by gas flow meter, Emerson Rosemount Annubar® Model 485. The flow meter is part of an automated monitoring system which is in line with standard EN 14181. The flow meter is connected to the AMS which automatically records the values every 2 seconds. The AMS also generates hourly data from the 2-sec data. The files are saved month-wise. Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then	<b>CAR 04</b> <b>CAR 05</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>forwarded to n.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS.</p> <p>The monitoring equipment has been checked physically during onsite visit. Besides interview with personnel has been conducted.</p> <p>Conclusion: The monitoring procedure is as per reg PDD. However CAR 04 and CAR 05 have been raised.</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 Annex 2.</i></p>	<p>/IM01/ /PDD/ /AM34/ /MR/ /AST/ /QAL1/ /QAL2/ /RAW/ /CAL/ /CoC/ /NATGAS/</p>	<p>Description: AM0034 requires all key meters for the N2O determination to be subject to a quality control regime that will include regular maintenance and calibration according to the European Norm EN 14181. The flow meter is part of the QAL1 approval. The QAL 2 has been performed on 22/06/2012 to 25/06/2012 and 23/09/2014 to 25/09/2014 by Müller-BBM GmbH. The AST according to EN 14181 was performed on 03/07/2012 to 04/07/2012 and 07/08/2013 and 22/10/2013 to 24/10/2013 also by Müller-BBM GmbH as well as from 01/03/2016 to 02/03/2016 again by Müller-BBM GmbH.</p> <p>As per latest QAL2 report the overall measurement accuracy is 2.082%</p> <p>Verifier's action:</p> <p>The measured flow gas values were checked during on-site visit, by means of data comparison tests, interviews and observations. Raw data, data from AMS, the ER calculation spreadsheet as well as QA/QC documentation has been checked. Furthermore the calibration procedures under QAL 3 and certificates of used span and zero gases have been analyzed.</p>	<p><b>CAR 04</b> <b>CAR 05</b></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.
		<p>Conclusion:</p> <p>Numerous QA/QC checks are implemented and foreseen, such as:</p> <ul style="list-style-type: none"> <li>- EN 14181 compliance (QAL 1 to QAL 3, AST) including check of analytical function (zero and span check)</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>Based on the above the monitoring system is duly calibrated. Besides delay in calibration, delay of conducting AST, has been identified for the periods 23/09/2015 – 05/01/2016. Related provisions as per VVS §395 have been applied by considering the maximum permissible error for the stated periods, meaning leading to higher project emissions.</p> <p>Nevertheless CAR 04 and CAR 05 have been raised.</p>		
<p><b>c) Correctness</b> (VVS, §§ 389-393)</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>	<p>/MR/ /PDD/ /XLS/ /RAW/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Description: For PC15: 79,878 Nm<sup>3</sup>/h. For PC16: 81,355 Nm<sup>3</sup>/h.</p> <p>Verifier's action: By means of checking ER spreadsheet against monthly data as well as hourly raw data.</p> <p>Conclusion: No mistake has been identified however CAR 04 has been raised.</p>	<b>CAR 04</b>	Ok
<b>C. PEn</b>		Total mass N2O emissions in each project campaign		
<p><b>a) Measurement / Determination method</b> (VVS, §§ 389-393)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p>	<p>/IM01/ /PDD/ /AM34/ /MR/</p>	<p>Description:</p> <p>The total mass N2O emissions in each project campaign is not monitored directly but calculated via following equation:</p> <p><math>PEn = VSG \times NCSG \times 10^{-9} \times OH</math></p>	<b>Ok</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>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.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>	<p>/AST/ /QAL1/ /QAL2/ /RAW/ /LOG/</p>	<p>For further details of the VSG, NCSG and OH please see related parameter assessments.</p> <p>The gas analyzer (NCSG) and flow meter (VSG) are connected to the AMS which automatically records the values every 2 seconds. The AMS also generates hourly data from the 2-sec data. The files are saved month-wise.</p> <p>The operation time is recorded by the process control system and noted in production log. The value is also recorded in the technical manager log spreadsheet shift-wise for each of the two plants.</p> <p>Every Friday the data from AMS and process control system is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to n.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS.</p> <p>The monitoring equipment has been checked physically during onsite visit. Besides interview with personnel has been conducted.</p> <p>Conclusion: The monitoring procedure is as per reg PDD.</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</i></p>	<p>/MR/ /PDD/</p>	<p>Description: No specific QA/QC procedure is applicable as this parameter is calculated.</p> <p>Verifier's action: by means of checking MR and PDD.</p>	<b>Ok</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>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 Annex 2.</i>		Conclusion:  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/ /LOG/ /XLS/ /RAW/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: For PC15: 131.773 tN <sub>2</sub> O. For PC16: 152.150 tN <sub>2</sub> O. Verifier's action: By means of checking ER spreadsheet against production log and technical manager log. Conclusion: No mistake has been identified however CAR 04 has been raised.	<b>CAR 04</b>	Ok
<b>D. OHn</b>		Total operating hours during each project campaign		
<b>a) Measurement / Determination method (VVS, §§ 389-393)</b> <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DALO)). 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>	/IM01/ /PDD/ /AM34/ /MR/ /PDD/ /LOG/ /RAW/ /XLS/	Description: The total operation hours for each campaign are monitored by the process control system.  The operation time is recorded by the process control system and noted in production log. The value is also recorded in the technical manager log spreadsheet shift-wise for each of the two plants.  Every Friday the data from AMS and process control system is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to n.serve on a weekly	<b>Ok</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS.</p> <p>The monitoring equipment has been checked physically during onsite visit. Besides interview with personnel has been conducted.</p> <p>Conclusion: The monitoring parameter is measured and determined as per requirements.</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 Annex 2.</i></p>	<p>/MR/ /PDD/</p>	<p>Description: No specific measurement equipment is installed to monitor this parameter. The parameter is recorded by the process control system of the related nitric acid plant. As the signal is logged continuously in the plant's DCS, there is a high accuracy.</p> <p>Verifier's action: 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 methodology</p> <p>Conclusion: The value given in the monitoring report and used in ER calculation is correct.</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>	<p>/MR/ /PDD/ /LOG/ /XLS/ /RAW/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Description: For PC15: 4,569 h. For PC16: 4,590 h.</p> <p>Verifier's action: By means of checking ER spreadsheet against production log and technical manager log.</p> <p>Conclusion: No mistake has been identified.</p>	Ok	Ok
<b>E. NAP</b>		Metric tonnes of 100% concentrated nitric acid during each		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		project campaign		
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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/  /MR/  /RAW/</p>	<p>Description: The Nitric Acid plant output is measured by a Coriolis flow meter (Micro Motion Emerson mass flow meter) CMF 300 serial number 414940 and 11007573 according to the registered monitoring plan. The instrument measures nitric acid temperature, density and mass flow. The concentration is then calculated internally from this data and the DSC converts the signal to tons 100% HNO<sub>3</sub>/h. Operation personal creates a print out which is forwarded to the technical manager on daily basis. The technical manager inserts the data into the monthly technical manager log which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data shift-wise. This monthly file is then forwarded to n.serve on weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: By means of checking the daily print-out of DCS, raw data check and interview with the plant personnel the verifier can confirm that the measurement of this parameter is in line with the monitoring plan described in the PDD as well as the applied methodology.</p> <p>Conclusion: The verification team concludes that the measurement of this parameter is in line with the monitoring plan described in the PDD as well as according to the requirements of 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 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</p>	<p>/CAL/  /MR/  /PDD/  /XLS/</p>	<p>Description: Maintenance and calibration of the flow meter and density meter has been applied under the internal QA/QC procedures implemented for this instrument. No inaccuracies in the measurements have been identified. Neither were inaccuracies beyond the permitted range identified during the calibration process. External calibrations have been carried out on 09/03/2011, 19/05/2014 and 18/05/2017. The validity of the calibrations is three years. The accuracy of the coriolis mass</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>met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</p> <p>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</p>		<p>flow meter is <math>\leq 0.1\%</math>.</p> <p>Verifier's action: Calibration reports have been verified for checking possible inaccuracies detected in the instrumentation. Furthermore the PP investigates the correct function of the instrument by daily density &amp; concentration analysis based on 3 samples per day. The differences of these figures are in the focus regarding an adjustment of the instrumentation and plant operation.</p> <p>Conclusion: All applicable QA/QC procedures are met by the project owner and it can be concluded that the installed monitoring equipment is proper calibrated.</p>		
<p><b>c) Correctness</b> <b>(VVS, §§ 389-393)</b></p> <p>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</p> <p>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.</p> <p>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</p>	<p>/MR/ /PDD/ /LOG/ /XLS/ /RAW/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Description: For PC15: 138,055 tHNO<sub>3</sub>.</p> <p>For PC16: 141,281 tHNO<sub>3</sub>.</p> <p>Verifier's action: By means of checking ER spreadsheet against production log and technical manager log.</p> <p>Conclusion: No mistake has been identified.</p>	Ok	Ok
<b>F. TSG</b>		Temperature in the stack gas		
<p><b>a) Measurement / Determination method</b> <b>(VVS, §§ 389-393)</b></p> <p>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</p> <p>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.</p> <p>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/ /AM34/ /MR/ /AST/ /QAL1/ /QAL2/ /RAW/</p>	<p>Description: The temperature measurement device is part of the volume flow measurement instrument. The measurement is at the same place as the volume flow/pressure measurement. A Rosemount thermocouple PT100_385 3-wire RTD is installed to monitor the temperature of the stack gas. The thermocouple is part of an automated monitoring system which is in line with standard EN 14181.</p> <p>The value from the thermocouple is used together with the actual pressure for the normalisation of the volume flow directly in the AMS. The thermocouple is connected to the AMS which automatically records the values every 2 seconds. The AMS also generates hourly data from the 2-sec data. The files are</p>	<p><b>CAR 04</b> <b>CAR 05</b></p>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>saved month-wise.</p> <p>Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to n.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS.</p> <p>The monitoring equipment has been checked physically during onsite visit. Besides interview with personnel has been conducted.</p> <p>Conclusion: The monitoring procedure is as per reg PDD. However CAR 04 has been raised.</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 Annex 2.</i></p>	<p>/IM01/ /PDD/ /AM34/ /MR/ /AST/ /QAL1/ /QAL2/ /RAW/ /CAL/ /CoC/</p>	<p>Description: AM0034 requires all key meters for the N2O determination to be subject to a quality control regime that will include regular maintenance and calibration according to the European Norm EN 14181. The thermocouple is part of the QAL1 approval. The QAL 2 has been performed on 22/06/2012 to 25/06/2012 and 23/09/2014 to 25/09/2014 by Müller-BBM GmbH. The AST according to EN 14181 was performed on 03/07/2012 to 04/07/2012 and 06/08/2013 and 22/10/2013 to 24/10/2013 also by Müller-BBM GmbH as well as from 01/03/2016 to 02/03/2016 again by Müller-BBM GmbH.</p> <p>As per latest QAL2 report the overall measurement accuracy is 2.55%</p> <p>Verifier's action:</p>	<p><b>CAR 04</b></p> <p><b>CAR 05</b></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.
	/NATGAS/	<p>The measured temperature values were checked during on-site visit, by means of data comparison tests, interviews and observations. Raw data, data from AMS, the ER calculation spreadsheet as well as QA/QC documentation has been checked. Furthermore the calibration procedures under QAL 3 and certificates of used span and zero gases have been analyzed.</p> <p>Conclusion:</p> <p>Numerous QA/QC checks are implemented and foreseen, such as:</p> <ul style="list-style-type: none"> <li>- EN 14181 compliance (QAL 1 to QAL 3, AST) including check of analytical function (zero and span check)</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>Based on the above the monitoring system is duly calibrated. Besides delay in calibration, delay of conducting AST, has been identified for the periods 23/09/2015 – 05/01/2016. Related provisions as per VVS §395 have been applied by considering the maximum permissible error for the stated periods, meaning leading to higher project emissions.</p> <p>Nevertheless CAR 04 and CAR 05 have been raised.</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.  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/  /PDD/  /LOG/  /XLS/  /RAW/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Conclusion: The applied measurement method is appropriate and the values used are deemed correct.</p> <p>Verifier's action: By means of checking ER spreadsheet against production log and technical manager log however CAR 04 has been raised.</p>	<b>CAR 04</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>G. PSG</b>		Pressure in the stack		
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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>	/IM01/ /PDD/ /AM34/ /MR/ /AST/ /QAL1/ /QAL2/ /RAW/	<p>Description: The pressure measurement device is part of the volume flow measurement instrument. The measurement is at the same place as the volume flow/pressure measurement. A Rosemount pressure equipment is installed to monitor the pressure of the stack gas. The pressure measurement device is part of an automated monitoring system which is in line with standard EN 14181.</p> <p>The value from the pressure measurement device is used together with the actual temperature for the normalisation of the volume flow directly in the AMS. The thermocouple is connected to the AMS which automatically records the values every 2 seconds. The AMS also generates hourly data from the 2-sec data. The files are saved month-wise.</p> <p>Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to N.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS.</p> <p>The monitoring equipment has been checked physically during onsite visit. Besides interview with personnel has been conducted.</p> <p>Conclusion: The monitoring procedure is as per reg PDD. However CAR 04 and CAR 05 have been raised.</p>	CAR 04  CAR 05	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<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 Annex 2.</i></p>	<p>/IM01/ /PDD/ /AM34/  /MR/ /AST/ /QAL1/ /QAL2/ /RAW/ /CAL/ /CoC/ /NATGAS/</p>	<p>Description: AM0034 requires all key meters for the N2O determination to be subject to a quality control regime that will include regular maintenance and calibration according to the European Norm EN 14181. The pressure measurement device is part of the QAL1 approval. The QAL 2 has been performed on 22/06/2012 to 25/06/2012 and 23/09/2014 to 25/09/2014 by Müller-BBM GmbH. The AST according to EN 14181 was performed on 03/07/2012 to 04/07/2012 and 06/08/2013 and 22/10/2013 to 24/10/2013 also by Müller-BBM GmbH as well as from 01/03/2016 to 02/03/2016 again by Müller-BBM GmbH.</p> <p>As per latest QAL2 report the overall measurement accuracy is 0.70%</p> <p>Verifier's action:</p> <p>The measured pressure values were checked during on-site visit, by means of data comparison tests, interviews and observations. Raw data, data from AMS, the ER calculation spreadsheet as well as QA/QC documentation has been checked. Furthermore the calibration procedures under QAL 3 and certificates of used span and zero gases have been analyzed.</p> <p>Conclusion:</p> <p>Numerous QA/QC checks are implemented and foreseen, such as:</p> <ul style="list-style-type: none"> <li>- EN 14181 compliance (QAL 1 to QAL 3, AST) including check of analytical function (zero and span check)</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>Based on the above the monitoring system is duly calibrated. Besides delay in calibration, delay of conducting AST, has been</p>	<p><del>CAR</del> <b>04</b>  <del>CAR</del> <b>05</b></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.
		identified for the periods 23/09/2015 – 05/01/2016. Related provisions as per VVS §395 have been applied by considering the maximum permissible error for the stated periods, meaning leading to higher project emissions.  Nevertheless CAR 04 and CAR 05 have been raised.		
<p><b>c) Correctness</b> (VVS, §§ 389-393) <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/ /PDD/ /LOG/ /XLS/ /RAW/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Conclusion: The applied measurement method is appropriate and the values used are deemed correct.</p> <p>Verifier's action: By means of checking ER spreadsheet against production log and technical manager log however CAR 04 has been raised.</p>	<b>CAR 04</b>	Ok
<b>H. EFn</b>		Emission factor for campaign n		
<p><b>a) Measurement / Determination method</b> (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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>	<p>/IM01/ /PDD/ /AM34/ /MR/ /XLS/ /LOG/</p>	<p>Description: The emission factor for campaign n is calculated from parameter PEn an NAP as following:  <math>EF_n = PEn / NAP_n</math>  For the measurement method of the parameters PEn and NAP please refer to related checklist items.</p> <p>The value is calculated on monthly basis from the raw data in the technical manage log. The technical manager processes the raw data into the monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to N.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS. The</p>	<b>Ok</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.												
		procedure has been checked against reg PDD and MR as well as methodology and interview with personnel. Conclusion: The monitoring procedure is as per reg PDD.														
<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 Annex 2.</i>	/MR/ /PDD/ /IM01/	Description: Not applicable as the value is calculated. Verifier's action: Based on onsite observation and document check. Conclusion: The value given in the monitoring report and used in ER calculation is correct.	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/ /LOG/ /XLS/ /RAW/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: <table border="1" data-bbox="1039 954 1809 1098"> <thead> <tr> <th>Campaign</th><th>Initial</th><th>final</th><th>Unit</th></tr> </thead> <tbody> <tr> <td>For PC15:</td><td>0.000954</td><td>0.000994</td><td>tN2O/tHNO3</td></tr> <tr> <td>For PC16:</td><td>0.001077</td><td>0.001360</td><td>tN2O/tHNO3</td></tr> </tbody> </table> Verifier's action: By means of checking ER spreadsheet against production log and technical manager log. Conclusion: No mistake has been identified. However CAR 04 and CL 03 have been raised which had impact on the values.	Campaign	Initial	final	Unit	For PC15:	0.000954	0.000994	tN2O/tHNO3	For PC16:	0.001077	0.001360	tN2O/tHNO3	<b>CAR 04</b> <b>CL 03</b>	Ok
Campaign	Initial	final	Unit													
For PC15:	0.000954	0.000994	tN2O/tHNO3													
For PC16:	0.001077	0.001360	tN2O/tHNO3													
<b>I. EF<sub>ma,n</sub></b>		Moving average emissions factor derived over time from campaign specific emissions factors														
<b>a) Measurement / Determination method (VVS, §§ 389-393)</b> <i>Describe how the monitoring parameter was measured /</i>	/IM01/ /PDD/	Description: The moving average emission factor for campaign n is calculated from campaign specific emission factors EF <sub>n</sub> as	Ok	Ok												

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.												
<i>determined. Focus primarily on the original data level (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>	/AM34/  /MR/  /XLS/  /LOG/	following:  $EF_{ma,n} = (EF1+EF2+...+EFn) / n$  The value is only calculated after a campaign is finished from the data for the specific campaign. This value is calculated by N.serve. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.  Verifier´s action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS. The procedure has been checked against reg PDD and MR as well as methodology and interview with personnel.  Conclusion: The monitoring procedure is as per reg PDD.														
<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 Annex 2.</i>	/MR/  /PDD/  /IM01/	Description: Not applicable as the value is calculated.  Verifier´s action: Based on onsite observation and document check.   Conclusion: The value given in the monitoring report and used in ER calculation is correct.	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</i>	/MR/  /PDD/  /LOG/  /XLS/  /RAW/	<div><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment)</div> <div>Description:<table><tr><th>Campaign</th><th>Initial</th><th>final</th><th>Unit</th></tr><tr><td>For PC15:</td><td>0.000952</td><td>0.000955</td><td>tN2O/tHNO3</td></tr><tr><td>For PC16:</td><td>0.000960</td><td>0.000966</td><td>tN2O/tHNO3</td></tr></table></div>	Campaign	Initial	final	Unit	For PC15:	0.000952	0.000955	tN2O/tHNO3	For PC16:	0.000960	0.000966	tN2O/tHNO3	<del>CAR</del> <b>04</b>  <del>CL-03</del>	Ok
Campaign	Initial	final	Unit													
For PC15:	0.000952	0.000955	tN2O/tHNO3													
For PC16:	0.000960	0.000966	tN2O/tHNO3													

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>descriptions of the CARs raised.</i>		<p>Verifier's action: By means of checking ER spreadsheet against production log and technical manager log.</p> <p>Conclusion: No mistake has been identified. However CAR 04 and CL 03 have been raised which had impact on the values.</p>		
<b>J. EFp</b>		Emissions factor used for the specific campaign n to determine the emission reductions of that campaign		
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b>  <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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>	<p>/IM01/ /PDD/ /AM34/  /MR/  /XLS/  /LOG/</p>	<p>Description: The emission factor for the specific campaign n to determine the emission reduction of that campaign is derived as following:</p> <p>If <math>EF_{ma,n} &gt; EF_n</math> then <math>EF_p = EF_{ma,n}</math></p> <p>If <math>EF_{ma,n} &lt; EF_n</math> then <math>EF_p = EF_n</math></p> <p>The value is only calculated after a campaign is finished from the data for the specific campaign. This value is calculated by N.serve. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action: The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS. The procedure has been checked against reg PDD and MR as well as methodology and interview with personnel.</p> <p>Conclusion: The monitoring procedure is as per reg PDD.</p>	Ok	Ok
<p><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</i></p>	<p>/MR/  /PDD/  /IM01/</p>	<p>Description: Not applicable as the value is calculated.</p> <p>Verifier's action: Based on onsite observation and document check.</p> <p>Conclusion: The value given in the monitoring report and used in ER 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.												
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 Annex 2.																
<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/  /LOG/  /XLS/  /RAW/	<div><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</div> <div>Description:<table><tr><th>Campaign</th><th>Initial</th><th>final</th><th>Unit</th></tr><tr><td>For PC15:</td><td>0.000954</td><td>0.000994</td><td>tN2O/tHNO3</td></tr><tr><td>For PC16:</td><td>0.001077</td><td>0.001360</td><td>tN2O/tHNO3</td></tr></table></div> <div>Verifier’s action: By means of checking ER spreadsheet against production log and technical manager log.</div> <div>Conclusion: No mistake has been identified. However CAR 04 and CL 03 have been raised which had impact on the values.</div>	Campaign	Initial	final	Unit	For PC15:	0.000954	0.000994	tN2O/tHNO3	For PC16:	0.001077	0.001360	tN2O/tHNO3	<b>CAR 04</b> <b>CL 03</b>	Ok
Campaign	Initial	final	Unit													
For PC15:	0.000954	0.000994	tN2O/tHNO3													
For PC16:	0.001077	0.001360	tN2O/tHNO3													
K. EFmin		EFmin is equal to the lowest EFn observed during the first 10 campaigns of the project crediting period.														
<b>a) Measurement / Determination method (VVS, §§ 389-393)</b> Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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.	/IM01/ /PDD/ /AM34/  /MR/  /XLS/  /LOG/  /VER/	<div>Description: The minimum emission factor for the first campaigns is determined as following: If EFmin = Min(EF1 to EF10)</div> <div>The value is only calculated once after the 10th campaign is finished from the data for the specific campaigns. As this monitoring period covers the 13th and 14th campaign the value is already determined. No update was conducted. This value was calculated by N.serve as N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</div> <div>Verifier’s action: The data was checked against previous verification documents. The data in the final emission reduction calculation has been checked with the monthly files of the technical manager as well as raw data files from the AMS. The</div>	Ok	Ok												

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		procedure has been checked against reg PDD and MR as well as methodology and interview with personnel. Conclusion: The monitoring procedure is as per reg PDD.		
<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 Annex 2.</i>	/MR/ /PDD/ /IM01/	Description: Not applicable as the value is calculated. Verifier's action: Based on onsite observation and document check. Conclusion: The value given in the monitoring report and used in ER calculation is correct.	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/ /LOG/ /XLS/ /RAW/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: The value is 0.000417 tN2O/tHNO3. Verifier's action: By means of checking ER spreadsheet against production log and technical manager log. Conclusion: No mistake has been identified.	Ok	Ok
<b>L. EFreg</b>		Emissions cap for N2O from nitric acid production set by government regulation		
<b>a) Measurement / Determination method (VVS, §§ 389-393)</b> <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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</i>	/MR/ /PDD/	Description: The emission factor derived from national regulations is observed by the PP. Currently there is no N2O regulation in place which affects the project activity.	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>cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>Verifier's action: The national legislation on N2O emissions and situation of the environmental laws related NOX emissions have been cross-checked by local expert. Following web articles have been checked <a href="http://www.sataxguide.co.za/category/carbon-tax">http://www.sataxguide.co.za/category/carbon-tax</a></p> <p>Conclusion: No (new) relevant legislation affecting the project activity in South Africa has been promulgated during the current monitoring period. Furthermore the environmental management system is certified acc. to ISO 14001. No host country legislation that would affect the project activity has changed.</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 Annex 2.</i></p>		Not applicable		
<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>		<p><input type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>conclusion:</p> <p>not applicable</p>		
<b>M. CLn</b>		Length of each project campaign measured in metric tonnes of 100% concentrated nitric acid produced during that campaign.		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b>  Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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/  /AM34/  /MR/  /XLS/  /LOG/</p>	<p>Description:  The length of each project campaign is determined in comparison with the established historic campaign length CLnormal as following:  If CLn &gt;= CLnormal then all N2O values measured during baseline campaign are to be used for calculation of EF  If CLn &lt; CLnormal then EFBL has to be recalculated by eliminating all N2O values obtained during production beyond CLn from the calculation of EFn.  This determination is conducted after the end of a project campaign by N.serve. N.serve receives the operation data from the technical manager on weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.  Verifier's action:  By means of checking MR, PDD, methodology and emission reduction calculation spreadsheet as well as interview with PPs.  Conclusion:  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.</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.</p>	<p>/MR/  /PDD/  /IM01/</p>	<p>Description:  Not applicable as no measurement equipment is involved.</p>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<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. Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>				
<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/ /LOG/ /XLS/ /RAW/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: The value is for PC15: 138,055 tHNO3 and PC16: 141,281 tHNO3. Verifier's action: By means of checking ER spreadsheet against production log and technical manager log. Conclusion: No mistake has been identified.	Ok	Ok
<b>N. OPh</b>		Oxidation pressure for each hour		
<b>a) Measurement / Determination method (VVS, §§ 389-393)</b> <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DALO)). 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>	/IM01/ /PDD/ /AM34/ /MR/ /XLS/ /LOG/	Description: The oxidation pressure is monitored by Yokogawa Press Tx – pressure transmitter serial number F576FB671708. The data is observed and recorded digitally by the process control system continuously. The PCS provides directly hourly average values. Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to N.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report. Verifier's action: By means of checking MR, reg PDD as well as ER spreadsheet	<b>CAR 04</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		and technical manager log and interview with PP.  Conclusion:  The measurement procedure and data aggregation is as per reg PDD. Besides CAR 04 has been raised.		
<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 Annex 2.</i>	/MR/  /ISO/	Description:  The pressure transmitters have an accuracy of 1.7%.  The calibration is valid until the restart of the next campaign. This is due to practical means as the transmitters can only be dismantled when the plant is not in operation.  Verifier's action:  By means of checking calibration certificates, interview with PP as well as MR and reg PDD.  Conclusion:  QA/QC procedures were established and requirements are fulfilled. The monitoring equipment was duly calibrated for this entire monitoring period. Besides CAR 04 has been raised.	<b>CAR 04</b>	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/  /XLS/  /LOG/  /PDD/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description:  The value is used to determine whether the plant is operating within the normal operation range. OPh is therefore compared with OPnormal. VSG and NCSG data has to be eliminated during times when OPh is outside the OPnormal range for calculation of EFp.  Verifier's action:  By means of checking MR, reg PDD as well as ER calculation spreadsheet, technical manager log and hourly raw data by AMS and PCS.	<b>Ok</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		Conclusion: No mistake or inconsistency has been identified. EFp has been determined correctly based on OPh data.		
<b>O. OTh</b>		Oxidation temperature in the ammonia oxidation reactor (AOR) for each hour		
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b>  <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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>	<p>/IM01/  /PDD/  /AM34/  /MR/  /XLS/  /LOG/</p>	<p>Description: The oxidation temp. is monitored by thermocouple K310 S/steel serial number TP3285-3290. The data is observed and recorded digitally by the process control system continuously. The PCS provides directly hourly average values.</p> <p>Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to N.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action:</p> <p>By means of checking MR, reg PDD as well as Er spreadsheet and technical manager log and interview with PP.</p> <p>Conclusion:</p> <p>The measurement procedure and data aggregation is as per reg PDD. Besides CAR 04 has been raised.</p>	<b>CAR 04</b>	Ok
<p><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</i></p>	<p>/MR/  /ISO/</p>	<p>Description:</p> <p>The thermocouples have an accuracy of +/-1.0%.</p> <p>The calibration is valid until the restart of the next campaign. This is due to practical means as the thermocouples can only be dismantled when the plant is not in operation.</p>	<b>CAR 04</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>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 Annex 2.</p>		<p>Verifier's action:</p> <p>By means of checking calibration certificates, interview with PP as well as MR and reg PDD.</p> <p>Conclusion:</p> <p>QA/QC procedures were established and requirements are fulfilled. CAR 04 has been raised as calibration dates are missing in MR and certificates are missing.</p>		
<p><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.</p>	<p>/MR/ /XLS/ /LOG/ /PDD/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Description:</p> <p>The value is used to determine whether the plant is operating outside permitted range. Further OTh is a control parameter for AIFR.</p> <p>Verifier's action:</p> <p>By means of checking MR, reg PDD as well as ER calculation spreadsheet, technical manager log and hourly raw data by AMS and PCS.</p> <p>Conclusion: No mistake or inconsistency has been identified.</p>	Ok	Ok
<b>P. AFR</b>		Ammonia gas flow rate to the ammonia oxidation reactor		
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b> Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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</p>	<p>/IM01/ /PDD/ /AM34/ /QAL2/</p>	<p>Description:</p> <p>The ammonia gas flow rate is continuously monitored by orifice plate differential pressure transmitter Yokogawa serial number F570FD073708. The data is observed and recorded digitally by the process control system continuously. The PCS provides directly hourly average values.</p> <p>Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a</p>	<b>CAR 04</b>	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>is in line with the registered monitoring plan of the PDD and the applied methodology.</i>		<p>monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to N.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.</p> <p>Verifier's action:</p> <p>By means of checking MR, reg PDD as well as ER spreadsheet and technical manager log and interview with PP.</p> <p>Conclusion:</p> <p>The measurement procedure and data aggregation is as per reg PDD. Besides CAR 04 has been raised.</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 Annex 2.</i></p>	<p>/MR/ /PDD/ /CAL/</p>	<p>Description:</p> <p>The accuracy of the equipment is 1.25%. The calibration is valid until the restart of the next campaign. This is due to practical means as the thermocouples can only be dismounted when the plant is not in operation.</p> <p>Verifier's action:</p> <p>By means of checking calibration certificates, interview with PP as well as MR and reg PDD.</p> <p>Conclusion:</p> <p>QA/QC procedures were established and requirements are fulfilled. However CAR 04 has been raised.</p>	<b>CAR 04</b>	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>/MR/ /XLS/ /LOG/ /PDD/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Description:</p> <p>The value is used to determine whether the plant is operating outside permitted range. AFR is compared to AFRmax.</p> <p>Verifier's action:</p>	<b>Ok</b>	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>		By means of checking MR, reg PDD as well as ER calculation spreadsheet, technical manager log and hourly raw data by AMS and PCS.  Conclusion: No mistake or inconsistency has been identified.		
<b>Q. AIFR</b>		Ammonia to air ratio into the ammonia oxidation reactor		
<p><b>a) Measurement / Determination method (VVS, §§ 389-393)</b>  <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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>	<p>/IM01/  /PDD/  /AM34/  /QAL2/</p>	<p>Description:  The ammonia to air ratio is calculated based on results from parameter AFR and monitoring of air flow rate. Air flow rate is monitored continuously by orifice plate differential pressure transmitter Yokogawa serial number F570FD069708 which has been exchanged to Endress and Hauser FT-76002-1. The data is observed and recorded digitally by the process control system continuously. The PCS provides directly hourly average values.  Every Friday the data is transferred on a portable hard disk by the instrument engineer and also handed over to the technical manager. The technical manager archives the data on his computer. The technical manager processes the data into a monthly file which includes, shut down details, raw data from SCADA, pre-calculation of the related CDM data and ER, chart of the NCSG and daily NAP data. This monthly file is then forwarded to N.serve on a weekly basis. N.serve is processing the data and calculating the final emission reductions which are stated in the monitoring report.  Verifier's action:  By means of checking MR, reg PDD as well as Er spreadsheet and technical manager log and interview with PP.  Conclusion:  The measurement procedure and data aggregation is as per reg PDD. Besides CAR 04 has been raised.</p>	<b>CAR 04</b>	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 Annex 2.</i>	/ MR / / PDD / / CAL /	Description: The accuracy of the Yokogawa equipment is 1.66%. The calibration is valid until the restart of the next campaign. This is due to practical means as the thermocouples can only be dismantled when the plant is not in operation.  Verifier's action: By means of checking calibration certificates, interview with PP as well as MR and reg PDD.  Conclusion: QA/QC procedures were established and requirements are fulfilled. However CAR 04 has been raised.	<del>CAR</del> 04	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 / / XLS / / LOG / / PDD /	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: The value is used to determine whether the plant is operating outside permitted range. AFR is compared to AFRmax.  Verifier's action: By means of checking MR, reg PDD as well as ER calculation spreadsheet, technical manager log and hourly raw data by AMS and PCS.  Conclusion: No mistake or inconsistency has been identified.	Ok	Ok
<b>R. GSproject</b>		Gauze supplier for the project campaign		
<b>a) Measurement / Determination method (VVS, §§ 389-393)</b> <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i>	/ IM01 / / PDD / / INV /	Description: Is monitored via invoices received from the supplier of the gauze, for this monitoring period W.C. Heraeus.  Verifier's action:	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>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.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>By means of checking PDD as well as related invoice from gauze supplier as well as site observation and interview with personnel.</p> <p>Conclusion: Ok</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 Annex 2.</i></p>	/PDD/ /MR/	<p>Description: No measurement and crosscheck required.</p> <p>Verifier's action: By means of checking PDD, MR and by onsite observation.</p> <p>Conclusion: Ok.</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/	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p>Description: Taken from invoice of supplier.</p> <p>Verifier's action: By means of checking MR against supplier invoice.</p> <p>Conclusion:</p> <p>The gauze manufacturer is correct.</p>	Ok	Ok
<b>S. GCproject</b>		Gauze composition during the project campaign expressed as % by weight of the precious metals Platinum, Rhodium and, if applicable, Palladium comprising the Ammonia Oxidation Catalyst gauzes.		
<b>a) Measurement / Determination method</b>	/IM01/	Description: The gauze composition for this monitoring period is	Ok	Ok

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>(VVS, §§ 389-393)</b> Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (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/ /AM34/ /QAL2/	given with PC15: 60% Pt, 5% Rh and 40% Pd. PC16: 60% Pt, 5% Rh and 40% Pd. Verifier's action: By means of checking the invoice of the supplier. Conclusion: the gauze compistion is stated as per related invoice of the supplier.		
<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 with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.	/INV/	Description: Not applicable as this parameter is not monitored by measurement equipment. Verifier's action: Conclusion:	N/A	Ok
<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/ /INV/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) Description: Taken from invoice of supplier. Verifier's action: By means of checking MR against supplier invoice. Conclusion: the gauze compistion is stated as per related invoice of the supplier.	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
Emission analyzer	NCSG	3.346857.7	ABB AO2040 URAS 14	1.66% as per latest QAL2	22/06/2011 <sup>2</sup> 03/07/2012 06/08/2013 23/09/2014		QAL2 every 5 years AST every year	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 23/09/2015 To: 05/01/2016
gas flow meter	VSG	FT-76550	Emerson Rosemount Anubar	1367.71m <sup>3</sup> /h	28/11/2012 <sup>3</sup> 07/06/2013 02/04/2014	24/10/2014 26/05/2015	1 year	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
				2.082% as per latest QAL2	22/06/2011 <sup>2</sup> 03/07/2012 06/08/2013 23/09/2014		QAL2 every 5 years AST every year	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 23/09/2015 To: 05/01/2016
stack pressure probe	PSG	PT-76506		10mbar	28/11/2012 <sup>3</sup> 07/06/2013 02/04/2014	24/10/2014 26/05/2015	1 year	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
				0.7% as per latest QAL2	22/06/2011 <sup>2</sup> 03/07/2012 06/08/2013 23/09/2014		QAL2 every 5 years AST every year	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 23/09/2015 To: 05/01/2016
stack temperature	TSG	TE-76170	Emerson Rosemount	5°C	28/11/2012 <sup>3</sup> 07/06/2013	24/10/2014 26/05/2015	1 year	<input checked="" type="checkbox"/> No	From:

<sup>2</sup> Related QAL2 and AST as the monitoring equipment is included in the tests as per EN 14181

<sup>3</sup> Based on calibration certificates

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
probe			Anubar		02/04/2014			<input type="checkbox"/> Yes	To:
				2.55% as per latest QAL2	22/06/2011 <sup>2</sup> 03/07/2012 06/08/2013 23/09/2014		QAL2 every 5 years AST every year	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 23/09/2015 To: 05/01/2016
Nitric acid flow meter	NAP	11007573	Emerson coriolis flow meter CMF300	<=0.1%	19/05/2014		18/05/2017	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
pressure probe	OP <sub>h</sub>	PT-76002-1 F576FB671708	Yokogawa Oress Tx	1.7%	07/06/2013 02/04/2014	04/12/2014 25/05/2015 11/11/2015	For one campaign	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
thermocouples	OT <sub>h</sub>	TSAHL-76010	K310 S/steel Thermocouple	±1%	07/06/2013 02/04/2014	23/10/2014 29/05/2015	For one campaign	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
pressure measurement	AFR	FT-76003-1 F570FD073708	Yokogawa Orifice plate with D.P. transmitter	1.25%	07/06/2013 02/04/2014	04/12/2014 25/05/2015 11/11/2015	For one campaign	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
flow meter	AIFR	F570FD069708	Yokogawa Orifice plate with D.P. transmitter	1.66%	07/06/2013 02/04/2014	03/12/2014	For one campaign	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	From: To:
		FT-76002-1	E+H	1.25%	-	28/12/2014 25/05/2015 11/11/2015	For one campaign	<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>
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		

**TÜV NORD Revision history**

<i>Version</i>	<i>Date</i>	<i>Description</i>
20.0	14.08.2015	Further adjustments and reduction of redundant information
19.0	19.06.2015	Adoption of UNFCCC template to TÜV NORD guidance and instructions