VERIFICATION REPORT
ACHEMA, AB

VERIFICATION OF THE
ACHEMA UKL-7 PLANT N2O ABATEMENT PROJECT

MONITORING PERIOD:
17 JUNE 2009 TO 12 MAY 2011

LINE 2: 13/10/2009 - 12/05/2011
LINE 3: 17/06/2009 - 16/11/2010
LINE 4: 03/08/2010 - 09/03/2011
LINE 5: 12/08/2010 - 17/03/2011
LINE 7: 03/11/2009 - 08/12/2010
LINE 8: 21/11/2009 - 25/10/2010

REPORT NO. LITHUANIA-VER/0031/2011
REVISION NO. 02

BUREAU VERITAS CERTIFICATION

Report No: LITHUANIA-VER/0031/2011

VERIFICATION REPORT

Date of first issue: 18/11/2011	Organizational unit: Bureau Veritas Certification Holding SAS
Client: ACHEMA AB	Client ref.: Andrejus Šostakas Head of Innovation Centre

Summary:

Bureau Veritas Certification has made the 3rd periodic verification of the JI Track II Project "ACHEMA UKL-7 plant N2O abatement project", JI Registration Reference Number 0089, project of ACHEMA AB, located at Jonalaukis village, Rukla county, Jonava region municipality, Lithuania and applying the AM0034 "Catalyst reduction of N2O inside the ammonia burner of nitric acid plants" v02, methodology, on the basis of UNFCCC criteria for the JI, as well as the criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the host country criteria.

The verification scope is defined as a periodic independent review and ex post determination by the Accredited Entity of the monitored reductions in GHG emissions during the defined verification period, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The first output of the verification process is a list of Clarification, Corrective Action Requests, Forward Action Requests (CR, CAR and FAR), presented in Appendix A.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in the approved project design documents. The installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reduction is calculated accurately and without material errors, omissions, or misstatements, and is total 855 112 tons of CO2eq for the monitoring period.

Our opinion relates to the project's GHG emissions and resulting GHG emission reductions reported and related to the approved project baseline and monitoring, and its associated documents.

Report No.: LITHUANIA-VER/0031/2011	Subject Group: JI	
Project title: ACHEMA UKL-7 plant N2O abatement project		
Work carried out by: Tomas Paulaitis: Lead Verifier		
Work reviewed by: Ashok Mammen		
Work approved by: Witold Dzugan		
Date of this revision: 20/12/2011	Rev. No.: 02	Number of pages: 27

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1 INTRODUCTION

ACHEMA, AB has commissioned Bureau Veritas Certification to verify the emission reductions of its JI project, the „ACHEMA UKL-7 plant N2O abatement project" (hereafter called "the project") located at Jonalaukis village, Rukla county, Jonava region municipality, Lithuania.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

Verification is a periodic independent review and ex post determination by the Accredited Independent Entity of the monitored reductions in GHG emissions during the defined verification period.

The objective of verification can be divided in Initial Verification and Periodic Verification.

UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the host country criteria.

1.2 Scope

The verification scope encompasses an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the Accredited Independent Entity. The verification is based on the submitted monitoring report, the determined project design documents including its monitoring plan and determination report, previous verification reports, the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the JISC and any other information and references relevant to emission reductions resulting from the project activity. These documents are reviewed against the requirements of the Kyoto Protocol, the JI modalities and procedures and related rules and guidance and also against Lithuanian national JI guidelines.
The verification is not meant to provide any consulting towards the Client. However, stated requests for clarification, corrective and/or forward actions may provide input for improvement of the project monitoring towards reductions in GHG emissions.

1.3 Verification Team

The verification team consists of the following personnel:

Tomas Paulaitis, M.Sci. (chemical engineering)
Bureau Veritas Certification Team Leader, Climate Change Verifier
Tomas Paulaitis is a lead auditor for environment and quality management systems and a lead GHG verifier (EU ETS, JI) with over 6 years of experience and was/is involved in the determination/verification of more than 30 JI projects.

This verification report was reviewed by:

Ashok Mammen
Bureau Veritas Certification, Internal Technical Reviewer
Bureau Veritas Certification Internal reviewer
Dr. Mammen is a lead auditor for environment, safety and quality management systems and a lead verifier and tutor for GHG projects. He has been involved in the validation and verification processes of more than 100 CDM/JI and other GHG projects.

2 METHODOLOGY

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, the verification protocol was customized for the project, according to version 01 of the Joint Implementation Determination and Verification Manual, issued by the Joint Implementation Supervisory Committee at its 19 meeting on 04/12/2009. The protocol shows, in a transparent manner, the criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a JI project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.

The completed verification protocol is enclosed in Appendix A to this report.

2.1 Review of Documents

The Monitoring Report (MR) version 4 dated 02/09/2010 submitted by submitted by ACHEMA, AB and additional background documents related to the project design and baseline, i.e. the country Law, Project Design Document (PDD), Approved CDM methodology and guidance on criteria for baseline setting and monitoring, Host party criteria, Kyoto Protocol, Clarifications on verification requirements to be checked by an accredited independent entity, were reviewed.

To address Bureau Veritas Certification corrective action and clarification requests, ACHEMA, AB revised the MR and resubmitted it on 10 November as version 7.
The verification findings presented in this report relate to the project as described in the PDD version 5 (dated 07/09/2009) and the Monitoring Report version 7 dated 10/11/2010.

2.2 Follow-up Interviews

On 03-04/10/2011 Bureau Veritas Certification performed on-site interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of ACHEMA, AB were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
ACHEMA, AB	Organizational structure, responsibilities and authorities Project implementation and technology Training of personnel Quality management procedures Metering equipment control Monitoring record keeping system Environmental requirements Monitoring plan Monitoring report

2.3 Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the GHG emission reduction calculation.

If the Verification Team assessing the monitoring report and supporting documents, identifies issues that need to be corrected, clarified or improved with regard to the monitoring requirements, it should raise these issues and inform the project participants of these issues in the form of:

(a) Corrective action request (CAR), requesting the project participants to correct a mistake that is not in accordance with the monitoring plan;

(b) Clarification request (CL), requesting the project participants to provide additional information for the Verification Team to assess compliance with the monitoring plan;

(c) Forward action request (FAR), informing the project participants of an issue, relating to the monitoring that needs to be reviewed during the next verification period.

The Verification Team will make an objective assessment whether the actions taken by the project participants, if any, satisfactorily resolve the issues raised, if any, and should conclude its findings of the verification.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

3 VERIFICATION CONCLUSIONS

In the following sections, the conclusions of the verification are stated.

The findings from the desk review of the original monitoring documents and the findings from interviews during the follow-up visit are described in the Verification Protocol in Appendix A.

The Clarification, Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Appendix A. The verification of the Project resulted in 5 Clarification Requests.

The number between brackets at the end of each section corresponds to the DVM paragraph.

3.1 Remaining issues and FARs from previous verifications

There are no remaining FARs from the previous verification.

3.2 Project approval by Parties involved (90-91)

The written project approval by the Netherlands was issued on 01/06/2010 by the DFP of that Party (NL Agency) when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines, at the latest.

The above mentioned written approval is unconditional (the Project approval does not provide any specific additional conditions for the Project implementation and monitoring).

3.3 Project implementation (92-93)

The purpose of the project is the reduction of nitrous oxide (N2O) emissions from nitric acid production Lines at the nitric acid plant of AB Achema. The Company is situated in Jonava, Lithuania.
Achema operates two nitric acid production lines, one manufactured by Grande Paroisse, the other by UKL. This project relates to the UKL-7 line. The plant has a nameplate capacity of 2,800 tonnes of nitric acid per day of operation. UKL-7 plant consists of 8 separate production lines. Each line has its own ammonia and air preparation and feeding system, oxidation chamber, heat exchange system, turbine and absorption tower with individual production schedules (production shutdowns, primary catalyst gauze changes, operating conditions). Tail gas ducts of individual production lines are connected to the common tail gas duct which takes the tail gas to 2 stacks, from which N2O is emitted to the atmosphere.
The installation of a secondary N2O reduction catalyst underneath the primary catalyst precious metal catching and catalytic gauzes package in

the ammonium burner was applied in 8 production lines of Achema UKL-7 nitric acid plant in the period from April 2008 through December 2008. In the presence of this catalyst, N2O is broken down into harmless constituents of N2 and O2.
The secondary catalyst was placed in the appropriate support structure. The gap between the edge of the support structure and the inside wall of the ammonia burner was sealed to prevent the process gas by-passing the secondary catalyst. In this way the technology ensures that all gases which pass through the primary catalyst will also pass through the secondary catalyst.
AMS installed at the operating plant is in compliance with the European norm EN14181, which assumes three levels of quality assurance of the measurement systems - QAL1, QAL2 and QAL3.
The first level (QAL1) is assured and certified by the measurement equipment provider and it refers to the performance and accuracy of the system. The second level of quality assurance (QAL2) guarantees the correct installation of the AMS and its proper operation at the plant. The third level (QAL3) is aimed to guarantee the maintenance and regular proper functioning of the measurement equipment and the measurement data provided (see Annex A section 101 (b) for details on means of verification).
An N2O emission monitoring system is installed in 8 nitric acid lines of the plant, each with its own burner, absorption column and expansion turbine. Each production Line represents a separate nitric acid production unit, independent from each other.
The primary catalyst is changed at different times thus it is necessary to measure the emissions from each Line individually. This means that eight separate sets of monitoring equipment are installed to measure tail gas flow, nitric acid production, nitric acid concentration, and the operating conditions. N2O concentration in the tail gas is measured by 3 switched concentration meters.

The project activity is completely operational and this has been confirmed during an on-site audit.

The project is implemented according to the description presented in the registered PDD. There are no project changes implemented after the previous verification.

3.4 Compliance of the monitoring plan with the monitoring methodology (94-98)

The monitoring occurred in accordance with the monitoring plan included in the PDD version 5 regarding which the determination has been deemed final and is so listed on the UNFCCC JI website: http://ji.unfccc.int/JI_Projects/DB/J2GCVCU6V2WU85ALR6GTD36P7QXIQQ/Determination/DNV-CUK1246515672.87/viewDeterminationReport.html, also taking into account monitoring plan section D.1 revisions which have been validated during the previous verification already.

Excel based calculation tool "THE N2O EMISSION REDUCTION CALCULATION MODEL (CALCULATION MODEL)" is developed to comply with the methodology AM0034 for "Catalytic reduction of N2O inside the ammonia burner of nitric acid plants" and the monitoring plan. The tool's operating principles are clearly described in the ACHEMA N2O EMISSION REDUCTION PROJECT MODEL USER MANUAL (MODEL MANUAL)".

MODEL MANUAL and CALCULATION MODEL were analyzed to ensure that the requirements of the AM0034 and Monitoring plan are fulfilled. All assumptions and references to the original data sources are clearly demonstrated, e.g. monitoring data, calibration parameters, nameplate capacity, the limit of extreme values. Emission factors are calculated using CALCULATION MODEL. Formulas and assumptions were verified and no discrepancies or mistakes found. Default emission reduction factors are not used.

CL 1 and CL2 which were related with monitoring plan have been resolved efficiently, see Annex 1 for more details.

3.5 Revision of monitoring plan (99-100)

Not applicable.

3.6 Data management (101)

All data collection procedures are implemented in accordance with the monitoring plan and JI MANUAL (last revised on 03/05/2010).
The Excel file of daily event register and N2O monitoring data (all raw data) are collected in EcoLogger system in an Excel file. After the end of the project campaign the Head Deputy of the Plant sends all campaign data to Vertis Environmental Finance, they paste the data to CALCULATION MODEL.
All CALCULATION MODELS are stored on the Vertis server in line with the storage requirements defined in the PDD for other project parameters. The models are always, prior to sending to the verifier and publishing on the UNFCCC website, subjected to the internal quality control. This

control consists of the control of the emission data as provided by Achema. These data are checked for their completeness and time accuracy. Further calculations are done by the project analyst and the results are audited by the supervising manager who has created the model and has excellent knowledge of its functionalities.

The Measurement equipment (including the Automatic measurement system and the Measurement system) is controlled and calibrated according to the requirements of JI MANUAL procedures.

CL 3-5 which were related with data management, have been resolved efficiently, see Annex 1 for more details.

3.7 Verification regarding programmes of activities (102-110)

Not applicable.

4 VERIFICATION OPINION

Bureau Veritas Certification has performed the 3rd periodic verification of the JI Track II Project "ACHEMA UKL-7 plant N2O abatement project", located in Lithuania which applies the AM0034 "Catalyst reduction of N2O inside the ammonia burner of nitric acid plants" v02. The verification was performed on the basis of UNFCCC criteria and the host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The verification consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of ACHEMA, AB is responsible for the preparation of the data on GHG emission and the reported GHG emission reductions of the project on the basis set out within the project Monitoring and Verification Plan indicated in the final PDD version 5 issued on 07/09/2009. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

Bureau Veritas Certification verified the Project Monitoring Report version 7 dated 10 November 2011 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as planned and described in the approved project design documents. The installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions.

Bureau Veritas Certification can confirm that the GHG emission reduction is accurately calculated and is free of material errors, omissions or misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emission reductions reported and related to the approved project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated, we confirm, with a reasonable level of assurance, the following statement:

Reporting period:	From 17/06/2009 to 12/05/2011	
Emission Reductions (year 2009):	89 287	t CO2 equivalents
Emission Reductions (year 2010):	594 247	t CO2 equivalents
Emission Reductions (year 2011):	171 578	t CO2 equivalents.
Emission Reductions (total):	855 112	t CO2 equivalents.

5 REFERENCES

Category 1 Documents:
Documents provided by ACHEMA, AB that relate directly to the GHG components of the project.

/1/ Project Design Document, version 5 dated 07/09/2009
/2/ Determination Report by Det Norske Veritas (DNV) No. 2008-086, version 02, dated 17/09/2009
/3/ 2th Monitoring period Verification report, issued by Bureau Veritas Certification on 14/01/2011
/4/ 3rd Monitoring Report version 4 dated 02/09/2011
/5/ 3rd Monitoring Report version 7 dated 10/11/2011
/6/ CALCULATION MODEL's (initial versions provided for verification):
Achema UKL-2 EmissionReduction vB1_P3_22.xls, dated 03/10/2011
Achema UKL-2 EmissionReduction vB1_P4_23.xls, dated 01/09/2011
Achema UKL-3 EmissionReduction vB_Overlap_P3_21.xls, dated 15/09/2011
Achema UKL-4 EmissionReduction vB2_P3_20.xls, dated 14/07/2011
Achema UKL-5 EmissionReduction vB1_P3_21.xls, dated 27/06/2011
Achema UKL-7 EmissionReduction vB1_P3_23.xls, dated 07/07/2011
Achema UKL-8 EmissionReduction vB1_P3_24.xls, dated 15/09/2011

/7/ CALCULATION MODEL's (final validated versions), all dated 10/11/2011:
Achema UKL-2 EmissionReduction vB1_P3_22.xls
Achema UKL-2 EmissionReduction vB1_P4_23.xls
Achema UKL-3 EmissionReduction vB_Overlap_P3_21.xls
Achema UKL-4 EmissionReduction vB2_P3_20.xls
Achema UKL-5 EmissionReduction vB1_P3_21.xls
Achema UKL-7 EmissionReduction vB1_P3_23.xls
Achema UKL-8 EmissionReduction vB1_P3_24.xls

Category 2 Documents:
Background documents related to the design and/or methodologies employed in the design or other reference documents.

/1/ AM0034 "Catalyst reduction of N2O inside the ammonia burner of nitric acid plants" v02
/2/ IPPC permit
/3/ QAL 2 reports for the AMS
/4/ AST reports for the AMS
/5/ Maintenance and documentation book
/6/ JI manual BI-122-2 UKL-7 plant
/7/ Operating manual
/8/ Primary catalysts loading protocols
/9/ Monitoring system supervision procedures
/10/ Internal audit procedures and records
/11/ CUSUM charts

/12/ Daily events logbook
/13/ ISO 17025 certificate issued to AIRTEC by DAR, No :DAP-PL-4170.00, valid until 01/04/2012

Persons interviewed:
List of persons interviewed during the verification or persons that contributed with other information that are not included in the documents listed above.

/1/ Andrius Kopustas, ACHEMA, Deputy chief of nitric acid plant
/2/ Stasys Pakstys, ACHEMA, Instrumentation department, Managing engineer
/3/ Ausra Januskeviciute ACHEMA, Innovation centre, Project manager

APPENDIX A: ACHEMA UKL-7 PLANT N2O ABATEMENT PROJECT VERIFICATION PROTOCOL

Check list for verification, according to the JOINT IMPLEMENTATION DETERMINATION AND VERIFICATION MANUAL (Version 01)

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
Project approvals by Parties involved				
90	Has the DFPs of at least one Party involved, other than the host Party, issued a written project approval when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines, at the latest?	A Project approval (Letter of Approval) from the Investor party was provided, issued by the Ministry of Economic Affairs, Netherlands, Agency NL Energy and Climate Change on 01/06/2010. This Letter of Approval was submitted to the secretariat during the first verification.	O.K.	O.K.
91	Are all the written project approvals by Parties involved unconditional?	Yes, all the written project approvals by Parties involved are unconditional.	O.K.	O.K.
Project implementation				
92	Has the project been implemented in accordance with the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website?	Installing a secondary N2O reduction catalyst underneath the primary catalyst precious metal catching and catalytic gauzes package in the ammonium burner as an N2O abatement technology was applied in UKL production lines of Achema plant in accordance with the PDD (version 5).	O.K.	O.K.
93	What is the status of operation of the project during the monitoring period?	The project was fully operational during the 3rd monitoring period and scope. The dates of the project campaign starting and end were verified accordingly to the records of UKL- 7 daily event log: *Line 2* Project campaign 3 FROM: 13/10/2009 TO: 21/10/2010 *Line 2* Project campaign 4 FROM: 22/10/2010 TO: 12/05/2011	O.K.	O.K.

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
		Line 3 Project campaign 3 FROM: 17/06/2009 TO: 16/11/2010 *Line 4* Project campaign 3 FROM: 03/08/2010 TO: 09/03/2011 *Line 5* Project campaign 3 FROM: 12/08/2010 TO: 17/03/2011 *Line 7* Project campaign FROM: 12/08/2010 TO: 17/03/2011 *Line 8* Project campaign 3 FROM: 21/11/2009 TO: 25/10/2010 The dates of the project campaign starting and end were verified accordingly to the records of UKL- 7 daily event log.		
Compliance with monitoring plan				

<table>
<tr><th>DVM Paragraph</th><th>Check Item</th><th>Initial finding</th><th>Draft Conclusion</th><th>Final Conclusion</th></tr>
<tr><td>94</td><td>Did the monitoring occur in accordance with the monitoring plan included in the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website?</td><td>The Excel based calculation tool “THE N2O EMISSION REDUCTION CALCULATION MODEL (CALCULATION MODEL) is developed to comply with the methodology AM0034 for “Catalytic reduction of N2O inside the ammonia burner of nitric acid plants” and the monitoring plan. The tool’s operating principles are clearly described in the ACHEMA N2O EMISSION REDUCTION PROJECT MODEL USER MANUAL (MODEL MANUAL)”.

MODEL MANUAL and CALCULATION MODEL were analyzed to ensure that the requirements of the AM0034 and the monitoring plan are fulfilled. The results of this analysis are described in the table below:

<table>
<tr><th>Requirement</th><th>Results</th></tr>
<tr><td>Determination of the permitted operating conditions of the nitric acid plant to avoid overestimation of baseline emissions</td><td></td></tr>
<tr><td>- oxidation temperature and pressure (permitted range from PDD)</td><td>O.K.</td></tr>
<tr><td>- ammonia gas flow rates and ammonia to air ratio input into the ammonia oxidation reactor (permitted range from PDD)</td><td>O.K.</td></tr>
<tr><td colspan="2">Determination of baseline emission factor:</td></tr>
<tr><td>- the monitoring system is to be installed using the European Norm 14181 (2004)</td><td>O.K.</td></tr>
<tr><td>- error readings (e.g. downtime or malfunction) and extreme values are to be automatically eliminated from the output data series by the monitoring system</td><td>O.K.</td></tr>
<tr><td>$BE_{BC} = VSG_{BC} * NCSG_{BC} * 10^{-9} * OH_{BC}$</td><td>O.K.</td></tr>
<tr><td>$EF_{BL} = (BE_{BC} / NAP_{BC}) (1 – UNC/100)$</td><td>O.K.</td></tr>
<tr><td>- any N_2O baseline data that are measured during the hours when the operating</td><td>O.K.</td></tr>
</table>
</td><td>CL1</td><td>O.K.</td></tr>
</table>

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
		conditions are outside the permitted range must be eliminated from the calculation of the baseline emission factor.		
		- the baseline campaign operated inside the permitted range for more than 50% of the duration of the baseline campaign	O.K.	
		- concluded with 95% confidence level, that average values of the permitted operating conditions are not different from average values obtained during the baseline determination period	O.K.	
		-impact of regulations	CL1	
		- the composition of the ammonia oxidation catalyst	O.K.	
		- campaign length	O.K.	
		- historic campaign length	O.K.	
		- baseline campaign length (CLBL)	O.K.	
		Project Emissions:		
		- the monitoring system is to be installed using the guidance document EN 14181	O.K.	
		- error readings (e.g. downtime or malfunction) and extreme values are to be automatically eliminated from the output data series by the monitoring system.	O.K.	
		PEn = VSG * NCSG * 10-9 * OH	O.K.	
		- derivation of a moving average emission factor	O.K.	
		- minimum project emission factor	N.A.	
		CL1: Please, renew and include "Comparison of the baseline emission factors against N2O mass limit in the IPPC permit" in the monitoring report.		
95 (a)	For calculating the emission reductions or	Not applicable.	O.K.	O.K.

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
	enhancements of net removals, were key factors, e.g. those listed in 23 (b) (i)-(vii) above, influencing the baseline emissions or net removals and the activity level of the project and the emissions or removals as well as risks associated with the project taken into account, as appropriate?			
95 (b)	Are data sources used for calculating emission reductions or enhancements of net removals clearly identified, reliable and transparent?	The CALCULATION MODEL is designed in such a way, that all automatic links are implemented inside the spreadsheet and the model performs emission reduction calculations automatically. All assumptions and references to the original data sources are clearly demonstrated, e.g. monitoring data, calibration parameters, nameplate capacity, the limit of extreme values, except for CL2: CL2: There is a statement in the monitoring report that "Operating hours defined as hours, when nitric acid production at least 0.1 tHNO3 and oxidation temperature at least 600°C occurred". 600 °C temperature level is defined in PLANT MANUAL also as temperature of the operation start. Please, clarify why temperature 704 °C is defined as minimum temperature in the CALCULATION MODEL sheet Summary, cell C185.	CL2	O.K.
95 (c)	Are emission factors, including default emission factors, if used for calculating the emission reductions or enhancements of net removals, selected by carefully balancing accuracy and reasonableness, and appropriately justified of the choice?	Emission factors are calculated using CALCULATION MODEL. Formulas and assumptions were verified and no discrepancies or mistakes found. Default emission reduction factors are not used.	O.K.	O.K.
95 (d)	Is the calculation of emission reductions or enhancements of net removals based on conservative assumptions and the most plausible scenarios in a transparent manner?	Not applicable.	O.K.	O.K.
Applicable to JI SSC projects only				
96	Is the relevant threshold to be classified as JI SSC project not exceeded during the monitoring period	Not applicable.	O.K.	O.K.

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
	on an annual average basis? If the threshold is exceeded, is the maximum emission reduction level estimated in the PDD for the JI SSC project or the bundle for the monitoring period determined?			
Applicable to bundled JI SSC projects only				
97 (a)	Has the composition of the bundle not changed from that is stated in F-JI-SSCBUNDLE?	Not applicable.	O.K.	O.K.
97 (b)	If the determination was conducted on the basis of an overall monitoring plan, have the project participants submitted a common monitoring report?	Not applicable.	O.K.	O.K.
98	If the monitoring is based on a monitoring plan that provides for overlapping monitoring periods, are the monitoring periods per component of the project clearly specified in the monitoring report? Do the monitoring periods not overlap with those for which verifications were already deemed final in the past?	Not applicable.	O.K.	O.K.
Revision of monitoring plan				
Applicable only if monitoring plan is revised by project participant				
99 (a)	Did the project participants provide an appropriate justification for the proposed revision?	Not applicable.	O.K.	O.K.
99 (b)	Does the proposed revision improve the accuracy and/or applicability of information collected compared to the original monitoring plan without changing conformity with the relevant rules and regulations for the establishment of monitoring plans?	Not applicable.	O.K.	O.K.
Data management				
101 (a)	Is the implementation of data collection procedures in accordance with the monitoring plan, including the quality control and quality assurance	All data collection procedures are implemented in accordance with the monitoring plan. The Excel file of daily event register and N2O monitoring data (all raw data) are collected in EcoLogger system in	O.K.	O.K.

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
	procedures?	an Excel file. After the end of the project campaign the Head Deputy of the Plant sends all campaign data to Vertis Environmental Finance, they paste the data to CALCULATION MODEL. All CALCULATION MODELS are stored on the Vertis server in line with the storage requirements defined in the PDD for other project parameters. The models are always, prior to sending to the verifier and publishing on the UNFCCC website, subjected to the internal quality control. This control consists of the control of the emission data as provided by Achema. These data are checked for their completeness and time accuracy. Further calculations are done by the project analyst and the results are audited by the supervising manager who has created the model and has excellent knowledge of its functionalities.		
101 (b)	Is the function of the monitoring equipment, including its calibration status, in order?	The European Norm EN 14181 stipulates three levels of quality assurance tests (QAL) and one annual functional test for Automated Measuring Systems which are recommended to be used as guidance regarding the selection, installation and operation of the Automated Measuring Systems under this Monitoring Methodology: 1. (QAL1). Application of tested Automated Measuring System (evaluation according to DIN EN ISO 14956). Calculation of Automated Measuring System uncertainty before installation according to EN ISO 14956. QAL 1 certificate for the AMS is issued on 13 July 2007 by MCerts (accredited by UKAS). QAL 1 certificate for the tail gas flow meter is issued on 16/10/2008 by TUVRheinland (accredited by DAR) was revieved and validated during the first verification already. 2. (QAL 2). Installation and Calibration of the Automated Measuring System according to the Standard Reference Measurement Method (SRM), determination of the measurement uncertainty/variability of the Automated Measuring System and	CL3, CL4, CL5	O.K.

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
		inspection of the compliance with the prescribed measurement uncertainties. QAL2 tests were performed by AIRTEC for all lines: in September 2010 for line 2, in December 2010 for line 1,4 and 5, in March 2010 for lines 3,6, 7, 8. AMS operation status was confirmed as normal without any malfunctions, however CL3-5 where issued (see below). AIRTEC is ISO 17025 certified lab, certificate issued by DAR, No: DAP-PL-4170.00, valid until 01/04/2012 was provided for verification. AST tests were not carried out on 2010 and now are planned for year 2011, because QAL2 tests were completed for all lines in 2010. 3. (QAL 3). Continuous quality assurance through the local operator/manager (drift and accuracy of the Automated Measuring System, verification management and documentation). UKL-7 N2O monitoring maintenance procedure in the scope of QAL3 is implemented effectively, including checking according to Shewart„s and CUSUM schemes. Other monitoring equipment is also controlled and calibrated according to these ACHEMA procedures: - calibration plan of N2O monitoring system related to the measuring equipment in UKL-7 nitric acid plant - N2O monitoring maintenance schedule - list of devices applied in monitoring system. The new calibration function has been established and used since the date of QAL2 tests, except for lines 3,7 and 8: CL3: Please, clarify how function coefficients a and b of the regression line are defined in case of lines 3,7 and 8 in the CALCULATION MODEL after the date of the latest QAL2 test (01/03/2010), because these coefficients are not defined clearly in the latest QAL2 report).		

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
		The previous AST report (year 2009) indicated that few measuring instruments did not pass the test (volume flow line 6, pressure line 3 and pressure line 6). AST failure on lines 3 and 6 does not have any direct impact on the first periodic verification because the AST test was executed on July 21-24, 2009, while the monitoring period for Line 3 ends on 16 June 2009 and for Line 6 on 21 April 2009. Since Line 3 is in scope of the third verification, this issue was thoroughly verified, as a result CL4 is issued. Concerning Line 6 this issue was verified during the previous verification. CL4: It is noted in the AST test 2010 (Feb 25, 2010 – March 1, 2010, performed by Artec), section 10.4: "The pressure transmitters in lines 3 and 6 which failed the AST test in 2009 were changed shortly before the start of QAL 2 test (Feb 25, 2010). The correction factors of 0,98 for line 6 and 0,97 for line 3 should be used to recalculate the pressure results from the AST test 2009 until Feb 25, 2010". Please, clarify why the correction factor 0,97 was not applied in the CALCULATION MODEL to recalculate pressure results for line 3. CL5: The measurement range for the calibration function validity is renewed in the latest QAL 2 test reports and is quite low for some lines (e.g. 170 ppm for line 8). Therefore part of the measured values exceeds the measurement range for the calibration function validity in case of N2O concentration measurements for lines 2, 3, 4, 8. Please, prove the calibration function validity		

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
		according to the requirements of EN 14181, section 5.		
101 (c)	Are the evidence and records used for the monitoring maintained in a traceable manner?	Raw data, entered to the CALCULATION MODEL was checked and compared with the data stored in the Data logger. It is validated that all data are used in traceable manner, but see CL2 above.	O.K.	O.K.
101 (d)	Is the data collection and management system for the project in accordance with the monitoring plan?	Yes, see 101 (a) above.	O.K.	O.K.
Verification regarding programs of activities (additional elements for assessment)				
102	Is any JPA that has not been added to the JI PoA not verified?	Not applicable.	O.K.	O.K.
103	Is the verification based on the monitoring reports of all JPAs to be verified?	Not applicable.	O.K.	O.K.
103	Does the verification ensure the accuracy and conservativeness of the emission reductions or enhancements of removals generated by each JPA?	Not applicable.	O.K.	O.K.
104	Does the monitoring period not overlap with previous monitoring periods?	Not applicable.	O.K.	O.K.
105	If the AIE learns of an erroneously included JPA, has the AIE informed the JISC of its findings in writing?	Not applicable.	O.K.	O.K.
Applicable to sample-based approach only				
106	Does the sampling plan prepared by the AIE: (a) Describe its sample selection, taking into account that: (i) For each verification that uses a sample-based approach, the sample selection shall be sufficiently representative of the JPAs in the JI PoA such extrapolation to all JPAs identified for that verification is reasonable, taking into account differences among the characteristics of JPAs, such as:	Not applicable.	O.K.	O.K.

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
	− The types of JPAs; − The complexity of the applicable technologies and/or measures used; − The geographical location of each JPA; − The amounts of expected emission reductions of the JPAs being verified; − The number of JPAs for which emission reductions are being verified; − The length of monitoring periods of the JPAs being verified; and − The samples selected for prior verifications, if any?			
107	Is the sampling plan ready for publication through the secretariat along with the verification report and supporting documentation?	Not applicable.	O.K.	O.K.
108	Has the AIE made site inspections of at least the square root of the number of total JPAs, rounded to the upper whole number? If the AIE makes no site inspections or fewer site inspections than the square root of the number of total JPAs, rounded to the upper whole number, then does the AIE provide a reasonable explanation and justification?	Not applicable.	O.K.	O.K.
109	Is the sampling plan available for submission to the secretariat for the JISC.s ex ante assessment? (Optional)	Not applicable.	O.K.	O.K.
110	If the AIE learns of a fraudulently included JPA, a fraudulently monitored JPA or an inflated number of emission reductions claimed in a JI PoA, has the AIE informed the JISC of the fraud in writing?	Not applicable.	O.K.	O.K.

Table 2 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
CL1: Please, renew and include "Comparison of the baseline emission factors against N2O mass limit in the IPPC permit" in the monitoring report.	94	Annex "Comparison of the baseline emission factors against N2O mass limit in the IPPC permit" is included as requested in the revised monitoring report version 7.	It is validated, that regulatory emission factor is higher than the baseline emission factor of the campaigns, hence CL1 is closed.
CL2: There is a statement in the monitoring report that "Operating hours defined as hours, when nitric acid production at least 0.1 tHNO3 and oxidation temperature at least 600°C occurred". 600 °C temperature level is defined in PLANT MANUAL also as temperature of the operation start. Please, clarify why temperature 704 °C is defined as minimum temperature in the CALCULATION MODEL sheet Summary, cell C185.	95 (b)	In all the CALCULATION MODELS sheet Summary, cell C185, the value is corrected to "600 °C". Recalculated MODELS and the revised accordingly monitoring report version is provided for verification.	Revised CALCULATION MODELS were reviewed and found in accordance with the monitoring plan and plant manual. Recalculation resulted in those emission reduction calculation changes: Line 3: from 50 449 to 49142 t CO_2 equivalent (note: the change is also the result of recalculation requested in CL4); Line 4: from 99 159 to 98 976 CO_2 equivalent. Results of other lines remain without changes after recalculation. CL2 is closed.

CL3: Please, clarify how function coefficients a and b of the regression line are defined in case of lines 3,7 and 8 in the CALCULATION MODEL after the date of the latest QAL2 test (01/03/2010), because these coefficients are not defined clearly in the latest QAL2 report).	101 (b)	Revised QAL2 (version 4) test report is provided by AIRTEC with clearly referenced regression line coefficients.	Regression line coefficients used in the CALCULATION MODELS where compared with coefficients provided in the revised QAL2 report, no discrepancies were found. Hence, CL3 is closed.
CL4: It is noted in the AST test 2010 (Feb 25, 2010 – March 1, 2010, performed by Artec), section 10.4: "The pressure transmitters in lines 3 and 6 which failed the AST test in 2009 were changed shortly before the start of QAL 2 test (Feb 25, 2010). The correction factors of 0,98 for line 6 and 0,97 for line 3 should be used to recalculate the pressure results from the AST test 2009 until Feb 25, 2010". Please, clarify why the correction factor 0,97 was not applied in the CALCULATION MODEL to recalculate pressure results for line 3.	101 (b)	Line 3 CALCULATION MODEL is revised, the correction factor 0,97 is applied to recalculate pressure results.	Revised CALCULATION MODEL was reviewed and found in accordance with AST test recommendation. Hence, CL4 is closed.

CL5: The measurement range for the calibration function validity is renewed in the latest QAL 2 test reports and is quite low for some lines (e.g. 170 ppm for line 8). Therefore part of the measured values exceeds the measurement range for the calibration function validity in case of N2O concentration measurements for lines 2, 3, 4, 8. Please, prove the calibration function validity according to the requirements of EN 14181, section 5.	101 (b)	The calibration function validity is proved taking into account these circumstances: 1) AMS are used jointly for 2-3 lines in the project: AMS No 3841: For Lines 1-3 (max. calibration function validity is 412 ppm for Line 3, this value can be assumed as validity level for all Lines 1-3); AMS No 3840: for Lines 4-6 (max. calibration function validity is 409 ppm for Line 5, this value can be assumed as validity level for all Lines 4-6); AMD No 3839L for Lines 7-8 (max. calibration function validity is 291 ppm, this value can be assumed as validity level for all Lines 7-8). 2) During the real QAL test, the calibration function validity is confirmed on the basis of actual measurement levels, and in case QAL test is performed at the beginning of the campaign (when N_2O emission level is lower), the confirmed validity value can be exceeded in the latest stages of the campaign. 3) AMS are controlled weekly with etalon gas 777 ppm concentration according to QAL3 procedures. No errors were found in CUSUSM charts during all the monitoring period.	The explanation was found reasonable, hence CL5 is closed.