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Verification Report

for **AB Achema, Lithuania**

Initial and First Periodic Verification
of the Registered JI Track-2 Project:

"Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertilizer Factory, Lithuania"

Monitoring period #1:
from 16/08/2008 to 26/09/2009

Report No. 1253366

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TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstrasse 199 - 80686 Munich - GERMANY

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Subject:		Initial and First Periodic Verification		
Executing Operational Unit:				
TÜV SÜD Industrie Service GmbH, Carbon Management Service Westendstrasse 199 - 80686 Munich, Federal Republic of Germany				
Project Participant (client):				
AB Achema, Jonalaukis village, Rukla county, Jonava region municipality, Lithuania				
Registration number / Project Title		Project 0064: "Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertilizer Factory, Lithuania"		
Monitoring period:		16-08-2008 to 26-09-2009		
First Monitoring Report (version/date)		Version 1.3 / 08.12.2009		
Final Monitoring Report (version/date)		Revision 1.7 / 20.04.2010		

Summary:

The certification body "climate and energy" of TÜV SÜD Industrie Service GmbH has been ordered by AB ACHEMA, Lithuania to carry out the initial and the first periodic verification of the registered JI project "Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertilizer Factory".

The verification is based on relevant UNFCCC requirements for the JI as well as requirements set by the host country (Lithuania) for approving projects under JI Track 2. In this context, the relevant documents are the "Marrakech Accords", recent regulations and guidance given by JISC as well as Lithuanian National guidelines and procedures for approving JI projects. During the verification the results of determination performed by the responsible AIE were taken into account. Refer to the Final Determination Report No.1029455 issued by TÜV SÜD on 16.12.2008.

The management of AB Achema is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions. A document review, followed by a site visit was conducted to verify the information submitted by the project participant regarding the present verification period. Based on the assessment carried out, the verifier confirms the following:

- the project has been implemented and operated in accordance with the description given in the registered PDD, version 10 dated 12.12.2008; and date of LoA issued by DFP (host country): 08.07.2008;
- the project is completely implemented as described in the registered PDD;
- the emission reductions presented in the current monitoring report does not deviate significantly from the emission reductions as indicated in the registered PDD;
- the monitoring plan complies with the applied methodology (AM0034, version 02 and the monitoring has been carried out in accordance with the monitoring plan.

Installed equipment essential for generating emission reductions run reliably and the meters are calibrated appropriately. The project is generating emission reductions as a JI project.

The verifier can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported, both determined using the valid and registered project's baseline, its monitoring plan and its associated documents.

Based on the information we have seen and evaluated, we confirm that the implementation of the project resulted in total of 701,550 t CO_2e of emission reductions during the verification period from 16-08-2008 to 26-09-2009.

Assessment Team Leader: Konrad Tausche **Assessment Team Members:** Olena Maslova (GHG-A), Constantin Zaharia (T)	**Veto Person:** Javier Castro **Certification Body responsible:** Thomas Kleiser

Abbreviations

AM	Approved Large Scale Methodology
AIE	Accredited Independent Entity
CAR	Corrective Action Request
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
ERU	Emission Reduction Unit
CO_2e	Carbon dioxide equivalent
CR	Clarification Request
DCS	Data Collection System; the DCS refers to a control system usually of a manufacturing system, process or any kind of dynamic system, in which the controller elements are not central in location but are distributed throughout the system with each component sub-system controlled by one or more controllers
DHP	Data Handling Protocol
DFP	Designated Focal Point
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(s)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRL	Information Reference List
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project Design Document
PP	Project Participant
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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Main Documents (referred to in this report)

Methodology (name / version)	AM0034, version 02	
Scope	05	
Technical Area	5.1 and 5.2	
Registered PDD:	version 10 / 12.12.2008	
Revised Monitoring Plan:	N/A	
Published Monitoring Report	1.3	08.12.2009
Revised Monitoring Report	1.7	20.04.2010
Project documentation link:	http://ji.unfccc.int/JI_Projects/DB/7V0ZW94D215XM41S7LPCAV3WQMRYXE/Monitoring/HEAOZIXHGWU4YPREZVST6A40PK28IP/viewMonitoringReport	

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1 INTRODUCTION

1.1 Objective

AB ACHEMA has commissioned an independent verification by TÜV SÜD Industrie Service GmbH (TÜV SÜD) of its registered JI project: "Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertilizer Factory, Lithuania".

The objective of the verification work is to comply with the requirements of the JI guidelines. According to this assessment TÜV SÜD shall make, upon receipt of a monitoring report, a determination of the reductions in anthropogenic emissions by sources reported by project participants. Thus, the responsible accredited independent entity (AIE) shall:

- ensure that the project activity has been implemented and operated as per the registered PDD "Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertilizer Factory, Lithuania" version 10, dated 12.12.2008, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place;
- ensure that the published MR and other supporting documents provided are complete, verifiable and in accordance with applicable requirements for JI Track 2;
- ensure that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology;
- evaluate the data recorded and stored as per the AM0034 Version 02: "Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants" and AM0028 version 4: "Catalytic N_2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants".

A separate *initial verification* is not a mandatory requirement. Though, it was conducted in October 2008 in order to verify that the project is implemented as planned, to confirm that the monitoring system is in place and fully functional, and to assure that the project can generate verifiable emission reductions.
In November 2009 the audit team has been provided with a consolidated Monitoring Report incl. underlying data records, covering the period for generating emissions reductions from 16.08.2008 to 26.09.2009. These documents served as a basis for the first periodic verification. The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan. Furthermore, the periodic verification evaluates the GHG emission reduction data and expresses a conclusion with a high but not absolute level of assurance about whether the reported GHG emission reduction data is free of material misstatements; and verifies that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification. The verification shall consider both quantitative and qualitative information on emission reductions. Quantitative information comprises all the physically stored data that is available on-site and that can be verified. Qualitative information comprises QA/QC procedures in place at the site.

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 Designated Operational Entity. The verification is based on the submitted monitoring report, the validated project design documents including its monitoring plan and determination report, previous verification reports, the applied monitoring methodology(s), relevant decisions, clarifications and guidance from the JISC and procedures as required by the host Party, as well as any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the

requirements of the Kyoto Protocol, the JI guidelines and Guidance on Monitoring (s. chapter C. in JI Guidance on Criteria for Baseline setting and Monitoring).
TÜV SÜD has applied a rule-based approach for the verification of the project. The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion.
The verification considers both quantitative and qualitative information on emission reductions.
The verification is not meant to provide any consultancy towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

1.3 GHG Project Description

Project activity:	"Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertilizer Factory, Lithuania"
UNFCCC registration number:	0064 (ITL-ID: LT2000005)
Project Participants:	AB ACHEMA
Location of the project:	Jonalaukis village, Rukla county, Jonava region municipality, Lithuania
Date of registration:	08.07.2008 (date of LoA issued by Host Party)
Starting date of the crediting period:	16.08.2008

The project activity involves the installation of a secondary catalyst to abate N_2O inside the ammonia burners once it is formed. Nitrous Oxide (N_2O) is an undesired by-product gas from the manufacture of nitric acid. N_2O is formed during the catalytic oxidation of ammonia. Over a suitable catalyst, a maximum 98% (typically 92-96%) of the fed ammonia is converted to Nitric Oxide (NO). The remainder participates in undesirable side reactions that lead to the production of N_2O, among other compounds. Waste N_2O from HNO_3 production is typically released into the atmosphere, as it does not have any economic value or toxicity at typical emission levels. N_2O is an important greenhouse gas which has a high Global Warming Potential (GWP) of 310.

2 METHODOLOGY

2.1 Verification Process

The applied verification approach is based on the provisions depicted in the latest Validation and Verification Manual.
Standard auditing techniques have been adopted for the verification process. The verification team performs first a desk review, followed by an on-site visit, which results in the formation of a protocol that includes all the findings. The next step involves the evaluation of the responses to the findings through direct communication with the PPs and then finally the preparation of the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB "climate and energy" before submission to the DFP of the host Party for final approval.

2.2 Verification Team

The appointment of the verification team takes into account the technical area(s), sectoral scope(s) and relevant host country experience required amongst team members for verifying the ER achieved by the project activity in the relevant monitoring period for this verification. The verification team consisted of the following members:

Name	Qualification	Coverage of scope	Coverage of technical area	Host country experience
Konrad Tausche	**ATL**	☑	☑	☑
Olena Maslova	GHG-A	☑	☑	☑
Constantin Zaharia	T	☑	-	-

Konrad Tausche is deputy head of the department "TÜV SÜD Carbon Management Service" and located in the head quarter in Munich. Because of his long term experience in environmental measurement technique he works as a GHG auditor with a special focus on the scope "Industrial Gases". The former head of department environmental measurement technique at the Frankfurt office of TÜV SÜD Industrie Service GmbH supports the team since December 2006. He has an academic background in physical and chemical engineering. An additional economic study was completed with the academic degree of a Master of Business Administration and Engineering (MBA and Eng.). In his experience of more than 15 years he inspected and verified a lot of different energy, chemical and incineration plants, emission control and mitigation projects. In this project he functioned as lead auditor and technical expert.

Olena Maslova (M.Sc. Chem) is an auditor in the "Carbon Management Service" department of TÜV SÜD Industrie Service GmbH in Munich, Germany. She is chemical engineer and host country expert for projects in Ukraine and Commonwealth of Independent States. Olena Maslova specializes in the assessment of CDM / JI projects in the sector of chemical industries and waste handling and disposal. In this project she functioned as auditor and project manager.

Constantin Zaharia is environmental engineer and is working as auditor trainee qualifying for a GHG auditor in the supra regional unit of the scope management for industrial gases in the Carbon Management Service Department of TÜD SÜD Industry Service GmbH, Germany. He has several years of experience in JI/CDM projects.

2.3 Review of Documents

The Monitoring Report dated on 08.12.2009 submitted by the PP was made publicly available on the TÜV SÜD website before the verification activities started. The published MR was assessed based on all the relevant documents as listed above. The aim of the assessment in the desk review was to:

- verify the completeness of the data and the information presented in the MR,
- check the compliance of the MR with respect to the monitoring plan depicted in the registered PDD and verify that the applied methodology was carried out. Particular attention to the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid,
- evaluate the data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

A complete list of all documents reviewed is available in annex 2 of this report.

2.4 On-site Assessment and follow-up Interviews

On December 10-11, 2009, as part of the verification procedure, TÜV SÜD assessment team has performed a physical site inspection and on-site interviews with project stakeholders to:

- confirm the implementation and operation of the project,
- review the data flow for generating, aggregating and reporting the monitoring parameters,
- confirm the correct implementation of procedures for operations and data collection,
- cross-check the information provided in the MR documentation with other sources,
- check the monitoring equipment against the requirements of the PDD and the approved methodology, including calibrations, maintenance, etc.,
- review the calculations and assumptions used to obtain the GHG data and ER,
- indentify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.

A list of the persons interviewed during this verification activity is included in annex 2.

2.5 Quality of Evidence to Determine Emission Reductions

Among several evidence items submitted, the following relevant and reliable evidence material have been used by the audit team during the verification process:

- On-site review and printouts of the TDC, SCADA-system
- Protocols of nitric acid production
- External data and national regulations
- Quality assurance documents
- Calibration certificates and maintenance list

Sufficient evidence covering the full verification period in the required frequency is available to validate the figures stated in the final MR. The source of the evidence will be discussed in chapter 3 of this report. Specific cross-checks have been done in cases that further sources were available. The monitoring report's figures were checked by the audit team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

2.6 Resolution of Clarification and Corrective and Forward Action Requests

The objective of this phase of the verification process is to resolve any outstanding issues which require clarification for TÜV SÜD positive conclusion of the achieved GHG emission reduction.

The findings raised as Forward Action Requests (if any) indicated in previous reports (determination/verification) were discussed during this phase and, issues raised in the FARs were resolved as far as possible, during communications between the PP and TÜV SÜD.
Concerns raised in the desk review, the on-site audit assessments and the follow up interviews and the responses provided for the raised concerns are documented in annex 1 (verification protocol) to guarantee the transparency of the verification process.

A *Corrective Action Request* (CAR) is raised where TÜV SÜD identifies:

- non-conformities in monitoring and/or reporting with the monitoring plan and/or methodology;
- that the evidence provided is not sufficient to prove conformity;
- mistakes in assumptions, data or calculations that impair the ER;
- FARs stated during determination that are not solved until the on-site visit.

A *Clarification Request* (CR) is raised where TÜV SÜD does not have enough information or the information is not clear in order to confirm a statement or data.

A *Forward Action Request* (FAR) is raised where TÜV SÜD identifies that monitoring and/or reporting require special attention or adjustments for the next verification period.
Information or clarifications provided as a response to a CAR, CR or FAR could also lead to a new CAR.

2.7 Internal Quality Control

As a final step of verification, the final documentation including the verification report and annexes have to undergo an internal quality control by the Certification Body (CB) "climate and energy", i.e. each report has to be finally approved either by the Head of the CB or the Deputy (a veto person can be used). In case one of these two persons is part of the assessment team, the approval can only be given by the person who is not a part of the assessment team. If the documents have been satisfactorily approved, these can be sent to JISC.

3 VERIFICATION RESULTS

In the following sections, the results of the verification are stated. The verification results relate to the project performance as documented and described in the final PDD and Monitoring Report ver. 1.5 from 12.02.2010. The verification findings for each verification subject are presented below:

3.1 FARs from Determination / Previous Verification

There are no remaining issues from the Determination.
After the initial verification – there were raised 1 CR, 7 CAR and 9 FAR:

Clarification Request 1:

A copy of the contract with the supplier of the secondary catalyst should be provided to the verification team.

A scheme where the single measuring devices are located should be provided. To identify the specific devices the internal number should be mentioned, too

Conclusion

A copy of the contract with BASF (IRL 9), the supplier of the secondary catalyst, has been provided.

The verification team checked the new MR ver. 1.5 and found a clear explanation in Figure 2, page 5 and in Annex III of the same document for tag numbers. Also, during the site visit the scheme has been checked with the reality and no deviations found.
This finding is closed.

Corrective Action Request #1:

Please make sure that at least at the time of the first verification an alternative verifiable and conservative evaluation approach of the missing NAP values is possible.

Conclusion

This issue has been extensively checked. For the period of 6 month (21.05 – 19.11.2008) when the HNO_3 flow meter was out of operation, the plant used the level meters from the storage tanks. In parallel, a mass balance theoretical calculation using AFR, ammonia conversion coefficient and absorption coefficient has been performed for plausibility check. The verification team asked for a parallel comparison of this approach with records of flow meter for May 2009.
The results proved that the approach used during the malfunction of flow meter was correct and conservative.
This finding is closed.

Corrective Action Request #2:

In order to ensure that operating conditions during the baseline campaign are representative of normal operating conditions, statistical tests should be performed to compare the average values of the permitted operating conditions with the average values obtained during the baseline determination period.

Please provide these statistical tests to the verification team.

Conclusion

Statistical tests have been provided to the verification team and checked. The conclusion was that operating conditions during the baseline are representative for normal operation conditions in AB ACHEMA.
This finding is closed.

Corrective Action Request #3:
The baseline campaign is not valid and must be repeated if the plant operates outside of the permitted range for more than 50% of the duration of the baseline campaign. The random check should be performed and the supporting data and evidences should be provided to the verification team.

Conclusion
Based on this excel files provided ("baseline calculation and evaluation V4.0. 11-02-2010.xls") and the on-site verification of the data presented in the excel file it is confirmed that more than 50% of the values are within the permitted range hence the baseline is valid.
This finding is closed.

Forward Action Request #1:
At the time of the first periodic verification invoices should be available for crosschecks in order to ensure that the primary gauze composition is remained unchanged over the historic campaigns and the baseline period.
The specifications of the secondary catalyst have to be provided to the assessment team as well.

Conclusion
These documents are confidential. The verification team had access to invoices for primary gauze for historic campaign/baseline during the on site visit.
For the specifications of the secondary catalyst see the answer at CR#1.
This finding is closed.

Forward Action Request #2:
TÜV SÜD assessment team recommended conducting the appropriate training of the responsible staff and developing the appropriate procedures. Moreover there is a need to provide a description of the data archiving management.

Conclusion
The verification team received the documents regarding the staff involved in the JI Project, the responsibilities and the periodical training they perform. Also, during the site visit, TÜV SÜD assessment team checked their knowledge and was satisfied of the results.
Data processing and archiving system, included also in MR (figure 3/page 6) has been checked during on site visit and found correct.
This finding is closed.

Corrective Action Request #4:
The methodology requires determining the uncertainty/variability of the AMS given by the calibration experiment (EN 14181). The required inspection of the compliance with the calculated uncertainty is meant to deduct the uncertainty from the baseline emissions as the conservative approach.
The uncertainty/variability of the AMS given by the calibration experiment must be parameterised into the data collecting and processing system in order to calculate the baseline emission factor.

Conclusion

In order to determine the uncertainty/variability of the AMS, AB ACHEMA, hired AIRTEC Company for a QAL 2 calibration. The verification team checked the QAL 2 documents provided by AIRTEC. The calculation algorithm used in the data collecting and processing system has been also checked and was found that the new calibrations coefficients resulted after QAL 2 are used. The Excel calculations reflect these changes, as checked by the verification team.
This finding is closed.

Forward Action Request # 3
Please elaborate a comprehensive list of all measuring equipment used as raw data for calculating the emission reduction.
This list should include specific information e.g. internal number, serial number, methodology-specific number of parameter, ranges, calibration and /or adjustment period (last/next) and a reference to the underlying procedure.

Conclusion
The list has been created and provided to the assessment team. It is a table (included in Annex III of the MR) which includes all measuring equipment with tag, serial number, calibration (last/next), accuracy and type. Also during the on site visit the calibration certificates and correct installation for all measuring equipment has been checked and no mistakes found.
This finding is closed.

Corrective Action Request #5:
Please provide a maintenance book/ modification book for the systems with all relevant parameters and calculations including the JI parameters.
Please provide the detailed description of the data collecting systems installed, including the list of parameters, description of user defined functions, individual configurations for each parameter and underlying formulae.
The results of the QAL 2 calibration must be taken into account and included in the configuration of the data collecting and processing system.
A workbook for maintenance works should be provided. The maintenance work, malfunction, downtime of the measuring equipment must be considered and the default values must be applied accordingly. E.g. define a procedure for what to do with the data during maintenance events (for instance, every week the reference gas is passed through the analyser).
The criteria to determine the operation of the facility must be defined reasonable and clear to determine the operating hours.

Conclusion
For maintenance book the list is provided ("Att.9 Maintenance and documentation book excel form.pdf"). This is a table with following columns: date/time, event/situation, what is done/based on what, name (who performed the intervention), comments. For troubleshooting/malfunction, there is another document (Att. No. 1) which describe the procedure: parameter (monitoring parameters as included in AM0034), position (serial no.), breakdown/malfunction character, action performed, data used (in acc. to AM0034).
Detailed description of the data collecting systems installed, including the list of parameters, description of user defined functions, individual configurations for each parameter and underlying formulae is presented in MR ver. 1.5.
For QAL2, the answer has been provided in CAR#4.
The operation of the facility is a parameter provided by the Control Room and, in case of "out of operation", automatically marked in CDMN2O program with "XNN"

The verification team checked the above documents and cross-checked the information stored in the Control Room/manual records with the data from JI calculation program.
This finding is closed.

Corrective Action Request #6:
Confirmations of the trainings conducted should be provided to the assessment team. Furthermore the introduction of the monitoring system software must be ordered by Achema and conducted by the AMS provider to achieve that the personnel involved in the CDM project have the necessary competence to ensure the required data quality.

Conclusion
Documents provided and checked (IRL 14).
This finding is closed.

Corrective Action Request #7:
To ensure the correct, transparent and successful performance of this JI project all responsibilities must be defined clear and transparent and documented in written form in complete manner.

Conclusion
All responsibilities are defined clear and transparent in MR ver. 1.5. The overall responsibility is represented by the Technical Director of AB ACHEMA. The assessment team checked MR and found the tree diagram clear.
This finding is closed.

Forward Action Request #4:
The troubleshooting procedures should be described clearly in the data handling protocol incl. definition of conservative assumptions and default values.

Conclusion
See also CAR#5. AB ACHEMA created a JI Manual (an official document with registration no.), which includes also a sheet for registration of revisions. During the on site visit, the verification team checked the Manual and the revisions performed and found it complete. The Technical Manager of AB ACHEMA signed for the revisions.
This finding is closed.

Forward Action Request #5:
A comprehensive presentation should be elaborated, thus it appears which data are archived by which source as well as the data flow from the acquisition to the final archiving including every step of processing.

Conclusion
The presentation has been created and included in MR. There is a graphical presentation explaining which data are archived by which source as well as the data flow from the acquisition to the final archiving including every step of processing. The assessment team checked also on site the correctness of the data flow and the archiving procedure and accepted it.
This finding is closed.

Forward Action Request #6:
To assure quality of the internal data additional documentation should be elaborated.

This documentation should be very transparent and traceable, including all relevant data and performed manual changes of values Events out of routine as well as manually changed values should be mentioned as Daily Events. For the baseline and project campaigns criteria for daily events should be clearly defined and whether default values must be applied. Clearly define which default value will be applied according to the daily event, if applicable.

Conclusion

The following documents have been created: "Report of daily events GP plant" in which every malfunction/unusual event is written (date/even/explanation). The second level is represented by "N2O Monitoring system troubleshooting procedure" which describes the action undertaken to correct the problem and the ongoing impact on data collection. Finally only the Deputy Head of the Plant shall decide upon the way of data modification during calculations of baseline and project emissions in Excel file. The whole procedure is clear and all manually changed values are easy to identify. The assessment team performed cross checks starting with events from "Report of daily events GP plant", comparing with the records from "N2O Monitoring system troubleshooting procedure", checking also in "Daily maintenance and documentation book", and – in case of a failure in nitric acid flow meter – with data from DCS. Last step was the identification of the default value introduced in Excel calculations. The procedure, as verified, is solid, transparent and traceable.

This finding is closed.

Forward Action Request #7:

At the time of the on-site visit the procedures were verified which are relevant for the quality of emission reductions. In order to optimize the process PPs agreed to implement so called data handling protocol which does summarize the single procedures and routines with relevance to the quality of emission reductions. The Quality assurance procedure for the NO-analyzer should be integrated in the data handling protocol.

As a result of this Initial Verification a finalized protocol should be provided at least at the time of the first periodic verification.

Conclusion

The Quality assurance procedure for the NO-analyzer as well as the procedures cited above in FAR#6 are now included in the new GP JI Manual V2.0/22.01.2010. The assessment team checked the Manual and found it appropiate

This finding is closed.

Forward Action Request #8:

The procedures for data archiving must be described in order to ensure that there are no data loses.
The all relevant data must be stored for at least two years.
The description of the data archiving for two data storage devices must be provided to the assessment team.
NAP value must be included in the DCS system.
The historical data for the last 4 campaigns must be provided in a clear, traceable and transparent manner. Furthermore the evidence information for gauze supplier and composition during the historic campaigns, baseline campaign and project campaign must be provided as well as dismantling reports.

Conclusion

The procedures for data archiving is explained in FAR#5.

All data are stored on two hard disks and on external support for two years. Data storage system has been checked during the on site visit and found correct.
NAP value is included in DCS system as checked on site.
Historical campaigns data starts with 01.04.2005. The document (IRL 8) has been provided to TÜV SÜD.
For documents regarding gauze supplier and composition during the historic campaigns, baseline campaign and project campaign see (IRL 2), (IRL 1), (IRL 3).
This finding is closed.

Forward Action Request #9:
After verification and after each reporting of emission reductions to the AIE, the Nitric Acid Plant Manager should organize a meeting with all staff involved in the execution of monitoring plan. The purpose of the meeting should be the internal data validation in order to ensure reliability of the reported emission reductions, identification of corrective actions in case and improvement of quality assurance procedures.

Conclusion
This is a requirement of the internal quality system in place at AB ACHEMA - ISO 9001 and ISO 14001.
This finding is closed.

The verification team confirms that the CR, CAR and FAR presented in the initial verification report have been correctly addressed by the PPs.

3.2 Project Implementation in accordance with the registered Project Design Document

The project is fully implemented according to the description presented in the registered PDD. The verifier confirms, through the visual inspection that all physical features of the proposed JI project activity including data collecting systems and storage have been implemented in accordance with the registered PDD. The project activity is completely operational and the same has been confirmed on-site.

3.3 Compliance of the Monitoring Plan with the Monitoring Methodology

The monitoring plan is in accordance with the approved methodology AM0034 (version 02) applied by the JI project activity.

3.4 Compliance of the Monitoring with the Monitoring Plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD.

Parameters based on metering devices are monitored by adjusted and/or calibrated equipments that are in line with the Calibration and Maintenance Protocol, included in the JI Manual. Calibrations and maintenance are summarized in the chapter 4 of the JI Manual of the current monitoring period. TÜV SÜD assessment team verified by checking the provided documents that all calibration and maintenance routines were performed as indicated in the JI Manual. No deviations exceeding the

required frequency or the stated limits were found. Hence raw data of all measured parameters are reliable and serve as a solid basis for the reported emission reductions.
Data reliability and completeness have been verified by using DCS records and the PI graphs over the whole monitoring period for all key parameters. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameters to verify explanations given by ACHEMA. Some of these peculiarities (calibrations, adjustments or shutdowns) were used to check the data transfer from the metering systems to the data acquisition systems.

Verification of the performance of the data collection system
The assessment of the quality of the data collection system is the key to ensure the data reliability and completeness, as well as the consistency, the transparency and the correct application of the PDD and the methodology.
TÜV SÜD has checked the data collection system during the Initial Verification and rechecked it during the first verification period, as reported in the Annex1 Periodic Verification Protocol:
i) necessary procedures are in place and are followed (as JI Manual, production, training, maintenance procedure),
ii) responsibilities are defined (see JI Manual),
iii) internal data validation and cross-check is performed (Daily production meeting + Monthly production meeting),
iv) JI project plant staff is trained,
v) IT systems are transparent, reliable and secured,
vi) JI project related equipment is timely and correctly adjusted and/or calibrated

Data flow
The first level of data control is provided by a Data Collection System (DCS). This system (EMI 3000) is operated around the clock by staff in the control room.
The second level of data control operates via a SCADA (Supervisory Control and Data Acquisition) system, Data from this system is accessible to the Technology Department Manager, the Nitric Acid Department Manager and the Nitric Acid Technologist via computer software. On a regular basis data exports from the system in excel are conducted.
An automated monitoring system (AMS) has been installed using the guidance document EN 14181. Parameter information from analyzers and flow meters are fed into this data acquisition system. Here calculations are performed and hourly averages or the parameters are generated.
The Emission Calculator (CDMN2O ver. 1.0 of AFRISO) provides separate readings for N_2O concentration and gas volume flow continuously, generating average values for every 60 minutes of operation. Apart from these two parameters, temperature and pressure of the tail gas are recorded in the AMS.
The applied software (CDMN2O) is adequate for complete documentation of AMS, drift and precision (QAL3) according to EN 14181.
The maintenance procedures to the AMS are described in an AMS Manual.
Data collected in electronic form are stored in EMI3000 system computer which contains two hard discs with mirror function (RAID0), additional data are stored in external hard disc drive, which is installed in control room of GP department. Data collected in electronic form are printed from EMI 3000 system computer every day and is stored in Head's office of GP department (performed by Head of GP department).
From the data archive, the monitoring report extracts the essential data.

Data handling
Every business day Deputy Head of the plant shall verify the data collected in the EMI3000 monitoring system for the previous day or for weekends, the date of the report of electronic or paper

form, and shall also analyze any disorder of data collected or any deviation of the technological process parameters, and N2O concentration value excess of the maximal limit of calibration.
By the end of the current month till the 5th day of the next month the software engineer from subsidiary "Sistematika", who is responsible for data collecting, prepares month's data package consisting of day reports and daily maintenance, and documentation book 'Excel" in English and sends it via e-mail to Deputy Head of the plant. Deputy Head of the plant shall send the verified data together with the daily report register to UAB COWI Baltic.
No less than in 10 day's period after the end of the production campaign and according to the procedure included in the AM0034 methodology, Deputy Head performs baseline emission factor EF_{BL} and project emission factor EFn calculations and calculates emission reduction ER (tCO2e) during the completed project campaign.
Explicit calculation details are taken from the Afriso program 'CDMN2O'. Explicit campaign data included in the 'CDMN2O' is entered in the text (CSV) file. Former campaign data collection and failure periods of equipment operation are taken into consideration during calculations.
Based on the validity of collected data, which emphasizes abbreviations and disorders entered in the daily maintenance and documentation book and daily events register, data change can be presented manually during the malfunction period. In such cases data collected in the DSC (Foxboro) can be used or respective rules for data change, as described in section 3 of the JI Manual, are applied.
Following the changes to calculations a revision list is filled and a file is resaved under a name of a new version. Changes to the calculations may be included by Deputy Chief of the plant or any person, who has an access and a permission of Deputy Head of the plant and Technical Director.

The verification of the parameters required by the monitoring plan is provided as follows:

Data / Parameter:	NCSG
Data unit:	mg/Nm^3
Description:	N_2O concentration in the stack gas
Source of data used:	Equipment used: ABB Infrared analyzer model AO2040, URAS26; instrument with TAG number AT08205. The measurement principle is a non-dispersive infrared absorption. The data output from the analysers will be processed using data processing system EMI 3000. All Information will be stored in electronic records for at least 2 years. The equipment used is certified according to QAL 1 and has been calibrated according to the requirements of EN 14181 as could be demonstrated by the QAL 2 reports performed by a third party accredited for this activity due to DIN EN ISO/IEC 17025:2005 between 30.06 and 04.07.2008. QAL 3 is done on regular basis (zero span adjustment is done every 1 week) and the QAL 3 control charts (CUSUM) are in place. The equipment used has been calibrated according to the requirements of the approved monitoring plan. The laboratory / third party used are accredited for the activity, hence the information can be considered verifiable.
Means of verification/Comments:	Raw Data (Original NCSG data) provided in the Excel calculation sheets were traced by the verifier with the help of screenshots over the whole period. The graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify the values. The reported data found to be consistent with the graphs.

Cross-check	In order to assess the correct adjustment and the data transfer from the analyzer to the EMI 3000 system, data obtained during QAL3 calibration was compared with certified reference value of test gas concentration. The verifier confirms that the analyzer was adjusted appropriate and the data were transferred correctly. For a comprehensive analyze of the QAL 3 calibration data see CAR 6 below. This issue has been extensively checked during the verification process and each QAL 3 event – both baseline and project – was presented in a separate document. See "Drift_evaluation_graphs_baseline_CAR6" and "Drift_evaluation_graphs_projectline_CAR6"

Data / Parameter:	VSG
Data unit:	m^3/h
Description:	Volume flow rate of stack gas
Source of data used:	This parameter is continuously measured by a gas volume flow metering Sensor DF25GR/M23 (Averaging Pitot Tube) with the TAG number FI08102. The data output from the pressure transmitters will be processed using data processing system EMI 3000. The information is stored in electronic records for at least 2 years. The QAL 2 calibration certificates were provided during the site visit.
Means of verification/Comments:	Data provided in the MR were traced by the verifier with the help of screenshots over the whole period. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given. The reported data found to be consistent with the graphs.
Cross-check	VSG has been compared with AFR and some inconsistency found. For more details see answer to CR 1* raised after CB review.

Data / Parameter:	NAP
Data unit:	t HNO_3
Description:	Nitric acid production (100% concentrate)
Source of data used:	The relevant data for nitric acid production (100% concentrate) is derived from Coriolis mass flow meter; DCS control system and SCADA system records the information. The measurements are performed continuously. The TAG number is: FT05201. For the period of malfunction of flow meter: 21.05.2008 – 18.11.2008, the plant used the level meters from the storage tanks. In parallel, a mass balance (theoretical calculation using AFR, ammonia conversion coefficient and absorption coefficient) has been performed for plausibility check. These data are the official data also entered in the management system for accounting purpose. Input data is kept in retraceable form in multiple paper copies as well as electronic format. The instruments are calibrated following a pre-defined plan which is part of the Quality System and reported in the "JI Manual". The documents provided by ACHEMA allowed the audit team to confirm that these instruments have been calibrated as required. AB ACHEMA nitric acid plant is ISO 9001 certified. Calibration routines and periodic check-up is followed up by the quality system. The calibration certificates were provided as evidence of the work performed.

	The equipment used has been calibrated according to the requirements of the approved monitoring plan.
Means of verification/Comments:	Production data inclusive the lab data were used for verification. For plausibility checks of nitric acid production, utilization of delivery and storage data were used: FIQ106, kg HNO3/h distributed to other plants (for fertilizer production) from the plant. The total amount of nitric acid FIQ106, kg HNO3/h registered hourly is uploaded to Excel file from DCS database. DCS system continuously measures the present level LIAHL101, LIAHL102:% of nitric acid in intermediate storages of nitric acid. Nitric acid level recorded hourly is uploaded to Excel file from DCS. Laboratory analysis of nitric acid concentration is carried out once a day. Concentration results of nitric acid entered in the laboratory register are manually transferred to calculation files The verification team checked the DCS records and laboratory analyses.
Cross-check	A cross-check has been performed for May 2009 using both methods: data from Coriolis mass flow meter against data from DCS (tank storage levels) and laboratory concentration calculated on a daily basis. The production of nitric acid was also crosschecked by theoretical approach using the ammonia input for nitric acid production. The theoretical approach has been used also for cross-checking values from baseline and project campaign. Thus, the reported "final acid" production data are plausible.

Data / Parameter:	TSG
Data unit:	°C
Description:	Temperature of the stack gas
Source of data used:	Resistance thermometer PT100 TAG number: TT08103 (EMI 3000 control system and SCADA system). The actual temperature of the stack gas is measured continuously. The calibration certificates were provided as evidence.
Means of verification/Comments:	Data provided in the MR were traced by the verifier with the help of CDMN2O csv files over the whole period. In case of peculiarities the graph for operation charts were zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given. The reported data found to be consistent with the graphs.
Cross-check	-

Data / Parameter:	PSG
Data unit:	Pa
Description:	Pressure of the stack gas
Source of data used:	Probe (bar abs) TAG number: PT-08102. The actual pressure of the stack gas is measured continuously by a probe that is part of gas volume flow meter. The calibration certificates were provided as evidence.
Means of verification/Comments:	Data provided in the MR were traced by the verifier with the help of CDMN2O csv files over the whole period. In case of peculiarities the graph for operation charts were zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other

	related parameter to verify explanations given. The reported data found to be consistent with the graphs.
Cross-check	-

Data / Parameter:	AFR
Data unit:	kg NH_3/h
Description:	Ammonia gas flow rate
Source of data used:	Measured by a flow meter (orifice plate DK10-300) with TAG number FT-01302. Data are acquired continuously. The flow is: flow meters, EMI 3000 control system and SCADA system. The instrument is calibrated according to the manufacturer`s specification and the internal calibration and maintenance plan which is part of the Quality System. The calibration certificates were provided as evidence.
Means of verification/Comments:	Data provided in the excel calculations were traced by the verifier with the help of EMI over the whole period. The reported data found to be consistent with the manual records.
Cross-check	The ammonia gas flow rate to the ammonia oxidation reactor for nitric acid production was crosschecked by the nitric acid production. The results are found to be consistent.

Data / Parameter:	OTh
Data unit:	°C
Description:	Oxidation temperature for each hour
Source of data used:	Measured by thermocouple (type K) with TAGs: TT 03004, TT 03010, TT 03017 and TT 03024 respectively for each reactor. Data are acquired every hour by the DCS and are saved continuously and automatically in the EMI system. The instruments are calibrated according to the manufacturer`s specification and the internal calibration and maintenance plan which is part of the Quality System. The calibration certificates were provided as evidence.
Means of verification/Comments:	Data provided in the excel sheets were traced by the verifier with the help of DCS records over the whole period. The reported data found to be consistent.
Cross-check	The crosscheck was performed with manual records.

Data / Parameter:	OPh
Data unit:	bar (a)
Description:	Oxidation Pressure for each hour
Source of data used:	Measured by manometer with TAG: PT-02301. It's in fact air pressure before mixing room. Data are acquired every hour in production log, DCS, EMI 3000 control system and SCADA system. The instrument is calibrated according to the manufacturer`s specification and the internal calibration and maintenance plan which is part of the Quality System. The calibration certificates were provided as evidence.
Means of verification/Comments:	Data provided in the excel sheets were traced by the verifier with the help of TDC records over the whole period. The reported data found to be consistent.
Cross-check	The crosscheck was performed with manual records.

Data / Parameter:	OH
Data unit:	h
Description:	Operating hours
Source of data used:	The DCS automatically records the hours of full operation of the plant during a campaign. The information is provided by the Control Room and in case of not operation, a "XNN" message is automatically generated. The information will be stored in electronic records and paper for at least 2 years.
Means of verification/Comments:	Data provided in the MR were traced by the verifier with the help of DCS and EMI 3000 system over the whole period. The reported data found to be consistent.
Cross-check	-

Data / Parameter:	GSproject
Data unit:	-
Description:	Gauzes supplier for the project campaigns
Source of data used:	Primary gauze certificates
Means of verification/Comments:	By assessing the delivery notes it can be confirmed that ACHEMA used the same composition and supplier (Johnson Matthey) of the primary gauzes as in the baseline. The information presented in the MR is correct.
Cross-check	The specification documents have been crosschecked with the provided invoice.

Data / Parameter:	GCproject
Data unit:	-
Description:	Gauzes composition for the project campaigns
Source of data used:	Primary gauze certificates
Means of verification/Comments:	By assessing the delivery notes and the related specification of the composition it can be confirmed that ACHEMA used the same composition of the primary gauzes as in the baseline (95% Pt/5%Rh (Gauze 1-3), 37%Pt/60%Pd/3%Rh (Gauze 4)). The information presented in the MR is correct.
Cross-check	The specification documents have been crosschecked with the provided invoice.

Data / Parameter:	EFreg
Data unit:	-
Description:	Emissions level set by incoming policies or regulations
Source of data used:	National regulations.
Means of verification/Comments:	An official translation of the IPPC Environmental Permit has been provided to the AIE. The verification team checked the EF included in this document with NCSG and Excel calculations. Corrections performed in calculations are found to be correct. For more details see answers to CR#1 and CR#8.
Cross-check	Official correspondence with Regional EPA.

3.5 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions

All data has been available and all the parameters have been monitored in accordance with the registered monitoring plan.
The reported data have been cross-checked against other sources available as explained above in chapter 3.4.

The verifier confirms that the methods and formulae used to obtained the baseline, project and leakage emissions are appropriate. The same has been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology.
The verifier confirms that the monitoring report includes all parameters and the monitored data at the intervals required by the methodology and PDD.
The verifier confirms that all the default values (ex-ante values from PDD) have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report.

4 SUMMARY OF FINDINGS

The verifier can confirm that the published MR and related documents are complete and verifiable in accordance with the JI requirements. All the findings raised by the verification team, the responses by the PPs and the conclusion from the team are presented in Annex 1. The means of verification and resulting changes in the MR or related documents are identified in the following table:

CAR 1: Calculations of ERs conducted in AFRISO system as well as in excel sheet should be performed in accordance with EB 51 Annex 12 "*CLARIFICATION TO AM0034 (VERSION 02): CATALYTIC REDUCTION OF N2O INSIDE THE AMMONIA BURNER OF NITRIC ACID PLANTS***"**. Updated excel sheet with ER calculations should be provided to the assessment team. Information about the performed re-calculations should be clearly stated in the Monitoring Report. In the same time, in order to increase the transparency, the clarity and the relationship with the Methodology, some corrections are necessary to be done: a) Missing Formulas: formulas behind the values starting with the first line of the columns (for ex. columns AL, AM, BG etc.) b) The measurement units included in column's headers should be consistent with the corresponding values from the cells (for ex. OH [h] in header and 3600 seconds in cells, etc). c) Clear definitions of the parameters extracted from AFRISO system (for ex. NCSG[L], NCSG[H], #NCSG, NCSG[ ] IR.v etc).
CAR 1, means of verification
The revised Excel calculations and Monitoring Report were reviewed by the verifier.
CAR 1, changes in the MR or related documents
According to the methodology applied as well as clarification given in Annex 12 EB 51 in case $CL_n<C_{Lnormal}$ the values were eliminated for the parameter $NCSG_{BC}$ beyond the length of CL_n for calculating mean values for $NCSG_{BC}$. The baseline emissions (BE_{BC}) were recalculated by using this mean value multiplied by the mean value of the volume of stack gas (VSG_{BC}) and total operating hours (OH_{BC}) of the baseline campaign. For recalculation of the EF_{BL} the nitric acid production (NAP_{BC}) corresponding to the total operating hours of the baseline campaign length (OH_{BC}) was used. This information is provided in the chapter 2.5 of the Monitoring Report. All necessary corrections were performed in the files: "baseline calculation and evaluation V4.0. 11-02-2010 " and "1st project line calculation and evaluation V4.0. 11-02-2010"

CAR 2: The Quality Assurance procedures as well as the troubleshooting procedures should be described in the JI Manual completely. The following improvements are required: 1. The JI Manual is thought as a living document which includes all improvements gained during the lifecycle of the project. Hence it is necessary that a well-defined identification number including revision number and date as well as the performed revisions must be indicated. 2. Procedures for troubleshooting about required actions (immediate and consecutive actions, improvements) in case of alarm settings, downtimes or malfunctions of metering systems or data losses as well as transparent descriptions of re-calculation and determinations of default

values must be defined and described transparent. 3. Quality assurance procedures about internal data validation, preparing the monitoring report and related responsibilities in general (e.g. chart) as well as for each single step must be presented completely. 4. Information about NAP data collection and calculation must be included. This requirement includes the standard procedure as well as the alternative approach in case of NAP flow meter malfunction in a transparent.
CAR 2, means of verification
The revised JI Manual and Monitoring Report were reviewed by the verifier
CAR 2, changes in the MR or related documents
1. The updated version of JI Manual includes revision number, date and the nature of the revision was provided. 2. The procedures for troubleshooting, and triggered actions and responsibilities are clear and complete described in the updated JI Manual. 3. The overall responsibility (Technical director of AB ACHEMA) and shared tasks as well as QA procedures are clearly described in the updated JI Manual. 4. In case of downtime of flow meter for the production of nitric acid, the production of nitric acid is calculated in an alternative way, using storage tanks level and laboratory analyses. The complete procedure is described in a transparent manner in the updated JI Manual. The values are checked for plausibility using ammonia mass balances. The cross check performed by AIE for May 2009 (simultaneous measurements flow meter /alternative approach) showed that the alternative approach is correct and conservative.

CR 1: With regard to the N2O limit values indicated in the updated version of IPPC permit a comparison is necessary between the emission limit values for the respective monitoring period in order to demonstrate compliance with national legislation. It should be clearly evidenced that the emission limit value stated in the IPCC permit would not have been exceeded without installation of the secondary catalyst. If the comparison results in a higher N2O - emission level, the baseline (i.e. the emission factor of the baseline) must be amended accordingly. Moreover, there is another ELV included in the Environmental Permit, not related to nitric acid production but to instantaneous emission into the atmosphere: g/s. So called in the permit "one time value". In our understanding it's about two emission limit values: one regarding emission in t/year (the plant is in compliance) and another one, "one time value" in g/s with regard to what the verification team noticed exceeding during the baseline campaign. In order to clarify the environmental compliance situation of the plant (baseline/project), an official letter from enforcing authority is requested.
CR 1, means of verification
Official translation of the IPPC Permit and Official letter form Local Authority (IRL 26) were checked by the verification team.
CR 1, changes in the MR or related documents. No
A comparison was performed between N2O limit values indicated in the updated version of IPPC permit and the emission values for the monitoring period year 2008 and 2009 separately. Calculations are presented in the excel file "Comparing of N2O emissions with IPPC permit V2.0.CR1." For that purpose baseline emission factor EF_{BL} was multiplied by the total nitric acid production in year 2008 and 2009

According to official answer of Kaunas Regional Environmental Protection Department, valid measurements of emissions – performed by third party (Laboratory of State Analytical Control Department of the Ministry of Environment of the Republic of Lithuania) will be performed starting with 1st January 2013. One time exceeding recorded in 2008 shall not be subject to prosecution for the plant. The plant operated within the range of annual emission norm during the year 2008.

CAR 3: The check if the plant operated during baseline campaign within the permitted operating ranges for temperature (OT) in the reactors was not performed correctly. The EMI 3000 system currently includes only the OT range for one of the four reactors. As described in the registered PDD correctly there are different OT ranges - one for each of the four burners - to be considered. This check must be corrected taking into account all 4 reactors. The revised check and the consequences to the validity of the baseline campaign (i.e. if the plant operated more than 50% in between the operational ranges) as well as the requirement to eliminate the N2O values during periods of running outside of the permitted range must be provided to the audit team. The Emission Reduction calculation sheet as well as the monitoring report must reflect the results. In addition the historical data used for establishing the permitted operating ranges of OT for each of the four reactors must be provided..
CAR 3, means of verification
The revised Excel calculation sheets and Monitoring Report were reviewed by the verifier.
CAR 3, changes in the MR or related documents
Historical data for all 4 reactors have been provided. Excel calculation files and MR have been amended in order to reflect the permitted operating ranges for all four reactors. The plant operated in baseline campaign more than 50% of the time (64%) inside the operating margins.

CR 2: During the on-site verification it was assessed that AFR_{max} in AFRISO system does not comply with that validated value as indicated in registered PDD. Even it was explained by the project participants that this was due to the use of different units, it should be evidenced that the validated value of AFR_{max} was applied correctly by the AFRISO system in order to eliminate N2O values which are above this maximum. ERs calculations and MR should be amended in case and provided to the assessment team..
CR 2, means of verification
The revised Excel calculation sheets and Monitoring Report were reviewed by the verifier.
CR 2, changes in the MR or related documents
According the historical data provided in the PDD AFRmax was set with units Nm3/h (15149,2 Nm3/h). In the EMI3000 system AFR values are monitored and stored with units kg/h. Therefore the AFRmax range is converted from Nm3/h in to kg/h by formula: 15149,2 *(17*1000 / 22,4 *1000) =11497,16 kg/h. 17(g/mol) – mole weight of ammonia 22,4 (mol/l) – volume of 1 mole The same conversion was used for AFRmin range: 12679,4 *(17*1000 / 22,4 *1000) =9622,76 kg/h

This information is provided in the chapter 2.2 of the Monitoring Report.

CAR 4: MR should be amended by including the information on normalization of the VSG values (flow meter in the stack) because the indications are not clear. In addition it is necessary to clarify the moisture content in the exhaust gas and the reason why it is not necessary to consider the water content in the calculation of the N2O mass flow by multiplying the N2O concentration (which is measured on a dry basis) and the volume flow. An analysis for water content in exhausted gas performed in winter conditions is requested. A statement regarding potentially steam injection in the stack during winter conditions is requested also.
CAR 4, means of verification
The revised Excel calculation sheets and Monitoring Report were reviewed by the verifier. New documents received.
CAR 4, changes in the MR or related documents
Monitoring Report provides information on normalization of the volume of stack gas (VSG) values. VSG is measured and recorded in to EMI3000 system every two seconds with units m3/h and in the same time VSG is normalized with PSG and TSG and is recorded with units Nm3/h every two seconds in EMI3000 system. In order to normalize VSG, PSG (hPa) and TSG (^{o}C) are measured and recorded every two seconds. In EMI3000 system normalization of VSG is performed by formula: VSG (Nm3/h)= VSG(m3/h)*273/(TSG+273)*PSG/1013 According to material balance the moisture content in the exhaust gas is 0.53 vol%. The mass balance is valid for a whole year i.e. for hot and cold periods. According to the technical project of GP plant – steam injection is not envisaged and not performed in any period.

CAR 5: During the on-site verification it was assessed that in case of downtime of the N2O analyzer the highest measured value is serving as a default value in the project campaign. However according to AM0034 the highest emission factor of the project campaign must be applied as default value in such a case. The excel calculation sheet must be revised and the ERs must be re-calculated and reported accordingly.
CAR 5, means of verification
The revised Excel calculation files and Monitoring Report were reviewed by the verifier.
CAR 5, changes in the MR or related documents
During downtimes of N2O analyzer the highest emission factor from whole project campaign was applied as a default value. ER was re-calculated accordingly in the updated file "1st project line calculation and evaluation V5.0. 20-04-2010.xls". See also CAR 1**

CAR 6: It was assessed randomly that during the baseline as well as during the monitoring period the results of QAL 3 of the N2O analyzer showed some span/ zero drift values to be out of the limit values (+/-3% of the measurement range), however no conservative corrections of the N2O values measured have been conducted.

The necessary conservative corrections of the values measured should be conducted. The excel calculation sheet must be revised and the ERs must be re-calculated and reported accordingly. Furthermore please provide complete QAL 3 charts for the baseline campaign and the project campaign to the audit team.
CAR 6, means of verification
The revised Excel calculation files and Monitoring Report were reviewed by the verifier.
CAR 6, changes in the MR or related documents
During baseline period some results of N2O analyzer's calibration showed span drift values to be out of the limit values ±119 mg/Nm3 (±3,04% of the measurement range). In case after calibration of span N2O concentration increased more than 119 mg/Nm3, N2O values since the last calibration were unchanged, because during this period the N2O concentration was lower and it is a conservative approach. In case after calibration of span N2O concentration decreased more than 119 mg/Nm3, the difference of N2O concentration was deducted from NCSG values (values not calibrated with QAL2 coeff.) registered for period since the last calibration till current calibration. Modified NCSG values were calibrated with QAL2 coefficients and applied in further calculations. Re-calculation of EF_{BL} is in the file "baseline calculation and evaluation V3.0. 18-01-2010". ER was re-calculated accordingly in the updated file "1st project line calculation and evaluation V3.0. 18-01-2010".

CAR 7: Please correct the maintenance schedule by including correct maintenance periods according to manufactures specification or applied standards of all JI relevant equipment. Furthermore please create an adjustment/calibration plan for the whole monitoring period incl. baseline and provide it to the assessment team. MR should be amended by including the list of the relevant equipment, last and next calibrations. Legal requirements for calibration frequency of the meters should be included also in this list. According to the alternative NAP data collecting approach, the flow meter FIQ 106 must be included in the existing QA/QC procedure and the maintenance schedule, too. In ATT. No. 6, PY 02301 is for pressure not for temperature as written in the table. These typos shall be corrected.
CAR 7, means of verification
The revised JI Manual and Monitoring Report were reviewed by the verifier.
CAR 7, changes in the MR or related documents
The maintenance schedule was updated including correct maintenance periods according to manufactures specifications and applied standards of all JI relevant equipment. The adjustment/calibration plan for the whole monitoring period incl. baseline has been created and included as an Annex in JI Manual. MR has been amended by including the list of the relevant equipment, last and next calibrations. The flow meter FIQ 106 has been included in the existing QA/QC procedure, troubleshooting procedure, maintenance schedule and calibration plan. The error has been corrected.

CR 3: EMI 3000 - Graphs of all measured parameters for the baseline and first project campaign should be provided as transparent pdf-files. In addition the raw data for baseline

campaign and the first project campaign should be provided as csv.data files.
CR 3, means of verification
Documents provided: "Achema.GP JI. operation charts of baseline campaign.CR3" "Achema.GP JI. operation charts of 1 project campaign.CR3" The raw data for baseline campaign and the first project campaign are in file "Achema.GP JI.details data of baseline and project campaigns.CR3". The verification team checked them for consistency with the excel calculation and didn't notice any discrepancies.
CR 3, New documents provided
EMI 3000 – Graphs and .csv files have been provided.

CR 4: A clarification is needed why the calculated amount of ER achieved in current monitoring period exceeds the amount estimated in the registered PDD. All differences in relation to the registered PDD and the reasons for that should be transparently explained. The revised monitoring report should include this information. A comparison (%), between ER estimated ex-ante (registered PDD) and ER achieved is missing
CR 4, means of verification
The documents provided were reviewed by the verifier.
CR 4, changes in the MR or related documents – No changes
Baseline evaluation has been made based on spot measurements and gave an EF_{BL} =7.07 kgN2O/tHNO3, continuous measurements during baseline resulted in an EF_{BL} = 8.8 kgN2O/tHNO3. Secondary catalyst efficiency assumed 80%, according to the provider, proofed to be more than 90% during operation. The difference is 21%.

CAR 8: The calculations of the emission reductions are performed with the help of an excel calculation sheet. This excel sheet must be password protected whereas the permitted access must be clearly described e.g. in the JI manual. A version control as well as performed changes must be indicated and described. In addition a comprehensive summary of the daily events and a clear indication of any manual corrections performed - easily traceable to calculations must be included. Please insert also a legend with all abbreviations, colour codes used (for e.g. GNB, etc) and definitions of parameters. Used abbreviations should be consistent with the PDD. There are some inconsistencies in the name of the parameters: NCSG/NSCG. Please check the excel sheet for such kind of typos.
CAR 8, means of verification
The revised Excel files, JI Manual ver. 2 and Monitoring Report were reviewed by the verifier.
CAR 8, changes in the MR or related documents
A revision list with indicated file versions and dates of performed changes is created in the excel file of emission reduction calculations. The sheet "downtime of AMS" lists all registered daily events (shutdowns, downtimes, troubles)

and includes explanation of manually performed correction in the calculations. All abbreviations of data marking are explained in the sheet "evaluation". The inconsistencies of the parameter names are corrected too. The above mentioned changes performed in the files: "1st project line calculation and evaluation V3.0. 18-01-2010" "baseline calculation and evaluation V3.0. 18-01-2010 ".

CR 5: As stated in the Environmental IPPC permit, there are ELVs for N_2O in the stack. For example in 2008 ELV was 104.98 g/s (or 1400 ppmv). During 2008 baseline period, for example on 18.04 hour 03:00 concentration was 3216.33 mg/m^3 and flow 142755.96 m^3/h. This leads to a N_2O concentration of 127.5 g/s. Please check the entire baseline period of 2008 and adjust $EF_{baseline}$ according to the IPPC limit values.
CR 5, means of verification
The revised Excel file and Monitoring Report were reviewed by the verifier.
CR 5, changes in the MR or related documents
During 2008 baseline period in case if N2O concentration was bigger than ELV (104,98 g/s) as stated in IPPC permit, the NCSG values of 2008 year exceeding this limit were reduced to 104,98 g/s and applied in further calculations. Re-calculation of EF_{BL} is in the file "baseline calculation and evaluation V3.0. 18-01-2010 "

CAR 9: There is an inconsistency of the indicated year in MR (page 3). Please check and correct the MR.
CAR 9, means of verification
The Monitoring Report was reviewed by the verifier.
CAR 9, changes in the MR or related documents
The date of the start of the first project campaign was corrected in the monitoring report – 2008 is written instead of 2009 year.

CR 6: For the six months period of NAP flow meter breakdown a theoretical approach of NAP calculation was applied. In order to cross-check this approach, please provide a mass-balance taking into consideration AFR/Ammonia consumption as the basic input parameter. Furthermore a comparison between calculated NAP values (according to the alternative approach) and the values measured by the NAP flow meter should be provided for the period of May 2009 in order to cross-check the two different approaches.
CR 6, means of verification
The documents provided were reviewed by the verifier.
CR 6, changes in the MR or related documents - No
For the period from 21.05.2008 until 19.11.2008 the cross-check calculations of NAP for baseline and first project campaign are separately performed. Calculations are performed considering the AFR/Ammonia consumption in the reactor, ammonia conversion coefficient and absorption coefficient. The calculations are presented in the file: "GP JI. Cross-check of NAP by massbalance.CR6" (IRL 27). A comparison between calculated NAP values (according to the alternative approach) and the values measured by the NAP flow meter for the period of May 2009 is in the file

"GP_HNO3_0905 data for crosscheck of NAP.CR6" (IRL 28).

Clarifications raised after first CB review:

CR 1*: During baseline campaign, the graphs of AFR, NAP and VSG have more or less similarity. However the graph of VSG during project campaign indicate considerable drop at the last 1/3 while AFR was constantly supplied. An explanation is required.
CR 1*, means of verification
The documents provided were reviewed by the verifier.
CR 1*, changes in the MR or related documents - No
During project campaign in summer time air compressor produced lower amount of air. To keep the same or very similar capacity of the plant we reduced the amount of secondary air. Because of that AFR approximately was in the same range, but due to lower amount of secondary air, total amount of VSG was lower at the last 1/3 of project campaign. Please find the graph of secondary air flow in the attached file "*graphs_1st_PC with explanation*". There you can see the changes of secondary air flow during summer time 2009. The data are from DCS Foxboro (IRL 46).

CAR 1*: In the Monitoring Report v1.5 dated 08.04.2010, it is mentioned methodology AM 0034 v3.3, but in the Determination Report it is mentioned methodology AM 0034 v0.2. Correction is required.
CAR 1*, means of verification
The new MR v1.6, dated 14.04.2010 provided was reviewed by the verifier.
CAR 1*, changes in the MR or related documents.
In the monitoring report we corrected the version number of methodology AM0034 in file *"GP_Monitoring_report_v1 6_14-04-2010".*

CR 2*: Information about calibration history around baseline campaign and project campaign is needed. Please submit all applicable records.
CR 2*, means of verification
The documents provided were reviewed by the verifier.
CR 2*, changes in the MR or related documents - No
The calibration evidences for 2007-2008 years in following files: OT_calibration_evidence.zip, OP_calibration_evidence.zip, NAP_calibration_evidence.zip, AFR_calibration_evidence.zip and AIFR_calibration_evidence.zip. (IRL 47). See CR 1**

Clarifications raised after second CB review:

CAR 1:** The EF used for downtimes of N2O analyzer during project campaign – 3.607 kg N2O/t HNO3 applied looks to be an abnormal value, i.e. abnormally high (too conservative) Instead of this, in case of downtime of the N2O, the highest EF can be chosen amongst the data in 95% interval (after filtering). Correction is needed.

CAR 1, means of verification**
The new MR v1.7, dated 20.04.2010 and new calculation file, "1st project line calculation and evaluation V5.0. 20-04-2010.xls" provided were reviewed by the verifier.
CAR 1, changes in the MR or related documents.**
In case of downtime of the N2Oanalyzer we applied the highest value amongst the NCSG data in 95 % interval. The highest value is 2.8474 kgN2O/tHNO3. We recalculated the EF. Please find calculation files V.5 and corrected monitoring report V.1.7.

PP answer to CR 2*: "Acc to First Periodic Verification Checklist (CAR 7) a new column 12 has been added to the Annex III indicating legal requirements for periodicity calibration of the meters. Unfortunately these calibration intervals were taken based on "Order of director of State Metrology Service V-178", which doesn't covers the technological measurements and not always coinsist with the real calibration intervals".
The calibration of emission related measurements (NCSG, VSG, PSG and TSG) is performed yearly, conforming with requirements for legal metrology acc to "Order No.V-178 of director of State Metrology Service".
CR 1**
As the baseline campaign started in Sep. 2007 and the monitoring period is 16/08/2008 to 26/09/2009 , we usually have to check all the applicable calibration records appropriate for that period incl. baseline and project campaign about NAP. Therefore, 2007-2008 is not sufficient.

comment [r1]: If the calibration frequency did not comply with the applicable national requirements, please consider to take conservative approach.

comment [r2]: Does this mean AST, Annual Surveillance Test to comply with EN14181? Explanation is needed.

CR 1, means of verification**
Additional information: "passport_9-1380_2.2.jpg (IRL 49)" and "factory_calibration_protocol_9-1641.jpg" (IRL 49) provided were reviewed by the verifier.
CR 1, changes in the MR or related documents - No.**
Answer regarding comment (r1) The mentioned paragraph means that "Order No. V-178 director of Lithuanian State Metrology Service regarding intervals of time between the validation for instruments assigned the legal metrology" establishes the calibrations intervals only for legal measurements (related with safety, health etc.) . For emission related measurements like NCSG, VSG, PSG, TSG the calibration intervals are kept according to this order too. The calibration intervals for customary technological measurements are set by the Metrological Service of Achema, based on experience and manuals of equipment. From 2007.09 till now the NAP measurements equipment was calibrated in the folowing way: 1. Corriolis Mass flowmetter serial No. 410293, Passport No 9-1380. Device used for NAP measurements from the start of baseline till 21.05.2008. Last calibration was performed 12.09.2006 .Calibration interval for such measurements acc. to Lithuanian requirements for legal metrology is 2 years-not overstepped. See record of positive bench calibration result :file: passport_9-1380_2.2.jpg.

2. Corriolis Mass flowmetter serial No. 12035303, Passport No 9-1641. Installed from 28.11.2008. Calibration was performed 18.10.2008 .Calibration interval for such measurements acc. to Lithuanian requirements for legal metrology is 2 years-not overstepped. See factory calibration protocol file: factory_calibration_protocol_9-1641.jpg. Answer regarding comment (r2) Depending on measuring principle and purpose of device additional bench or site verification and calibration are performed by accredited "Laboratory of metrology of Achema" in intervals indicated in Annexes II and III of MR. AST tests are performed for AMS by an accredited testing Laboratory (AIRTEC) in comply with EN14181.

5 VERIFICATION STATEMENT

TÜV SÜD Industrie Service GmbH has performed the initial and first periodic verification of the JI project: "Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertilizer Factory, Lithuania". The verification is based on the currently valid documentation of the UNFCCC, JISC as well as on requirements set by the host country (Lithuania) for approving projects under JI Track 2.
The management of AB ACHEMA is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the project's Monitoring Plan indicated in the final PDD ver. 10, dated 12.12.2008 and the applied methodology AM0034, version 03. JI Manual is to be considered as a living document is to be uploaded together with the Final Verification and Monitoring Reports.
The verifier can confirm that:

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring report;
- the project is operated as planned and described in the project design document approved by the DFP in the host Party;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements;

Our opinion is based on the project's GHG emissions and resulting GHG emission reductions reported, which have been both determined through the valid and registered project's baseline, its monitoring plan and its associated documents.
Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: from 16.08.2008 to 26.09.2009

Verified emissions in the above reporting period:

Emission reductions: 2008: 197,761 t CO_2e

2009: 503,789 t CO_2e

Total: 701,550 t CO_2e

Munich, 27.04.2010

Certification Body "climate and energy"
TÜV SÜD Industrie Service GmbH

Munich, 27.04.2010

Assessment Team Leader

Annex 1: Verification Protocol

Industrie Service

TABLE 1: INITIAL VERIFICATION CHECKLIST

OBJECTIVE	Ref.	COMMENTS	Concl.(incl. CARs/FARs/CRs)
A. Opening Session			
A.1. Introduction to audits		A brief presentation about the objectives of an Initial Verification as well as the following procedures, e.g. CAR, FAR and CR were made by the auditor at the opening session.	☑
A.2. Clarification of access to data archives, records, plans, drawings etc.		The verification team got open access to all required plans, data, records, drawings and to all relevant facilities.	☑
A.3. Contractors for equipment and installation works *Who has installed the equipment? Who was contracted for planning etc.?*	4, 5, 10, 16, 22	The monitoring system at Achema nitric acid plant was installed, adjusted and launched on 30th June 2007 at the end of campaign IV (campaign IV ended on 19th August 2007). The volume flow, temperature and pressure measuring probe is installed after expander unit and N_2O sampling probe directly after DeNOx reactor. Part of the volume flow rate monitoring system is also the measurement of the gas temperature and gas pressure. The N_2O monitoring system at GP plant is comprised of: ✓ N_2O analyzer AO-2000-URAS-14 (ABB) ✓ Flow meter DELTAFLOW (Systec) ✓ Data Server EMI 3000 ✓ Distributed control system (DCS) The installed N20-analyzer URAS 14 passed the QAL 1 performance test according to EN 14181 and EN ISO 14956 was supplied by ABB. The correct installation was confirmed by AIRTEC with a	**CR1**

OBJECTIVE	Ref.	COMMENTS	Concl.(incl. CARs/FARs/CRs)
		compliance check at an on-site visit in June 2008. AIRTEC is a German independent third party monitoring institute accredited according to DIN EN ISO/IEC 17025. The N2O-measurements required by EN 14181 (QAL 2) were performed by AIRTEC too which has a DIN EN ISO/IEC 17025 accreditation for N2O analysis. The QAL 2 Report according EN14181 for Achema GP has been submitted to the assessment team. Testing protocols and reports have been verified. The assessment team confirms that the installation and the loops were checked and found to be correct. AST and QAL 2 have been performed by the AIRTEC. The report confirms a proper operation of the equipment. *Clarification Request #1:* A copy of the contract with the supplier of the secondary catalyst should be provided to the verification team A scheme where the single measuring devices are located should be provided. To identify the specific devices the internal number should be mentioned, too.	
A.4. Actual status of installation works *Project installation should be finished at time of initial verification in so far as the project should be ready to generate emission reductions afterwards.*		All measurement equipment is installed and works properly.	☑

B. Open issues indicated in validation report *Especially in projects which are not yet registered at CDM-EB or JI-SB, there might be some outstanding issues which should have been indicated by the validation report.*			
B.1. Missing steps to final approval	23	The project is currently on the final determination stage. The determination report has already been issued by TÜV SÜD and does not state any open issues. Letter of Approval (LoA) was issued for the project on 08.07.2008 by the Ministry of the Environment of Lithuania. It was approved by the document (10-7)-D8-5963. TÜV SÜD has already submitted the project for final determination by the JI Supervisory Committee (JISC).	☑
C. Implementation of the project *This part is covering the essential checks during the on-site inspection at the project's site, which is indispensably for an initial verification*			

C.1. Physical components *Check the installation of all required facilities and equipment as described by the PDD.*	1, 2, 3, 9, 18, 20	All necessary equipment for emission reductions monitoring (AMS) is installed (Details see A.3.). Campaign V (baseline campaign) was launched on 5th September 2007. Emissions were monitored during the entire baseline campaign (the end of the baseline campaign was on 27th July 2008) after which a secondary catalyst was installed and on 16th August 2008 the first project campaign (VI) was launched. The secondary catalyst gauzes have been installed at the same time at all production lines. However during the baseline campaign the metering device for NAP measurement was broken down and at the time of the on-site verification was still out of order. Currently there are no raw data for nitric acid production from this measuring device during the last month of the baseline campaign and the beginning of the first project campaign available. During the on-site discussion it could be assessed that the baseline data evaluating meeting have not been TÜV SÜD assessment team recommended conducting the periodical baseline data evaluation meetings out during the baseline period. *Corrective Action Request #1:* Please make sure that at least at the time of the first verification an alternative verifiable and conservative evaluation approach of the missing NAP values is possible. *Corrective Action Request #2:* In order to ensure that operating conditions during the baseline campaign are representative of normal operating conditions, statistical tests should be performed to compare the average values of the permitted operating conditions with the average values obtained during the baseline determination period. Please provide these statistical tests to the verification team. *Corrective Action Request #3:*	**CAR1** **CAR2** **CAR3** **FAR1**

		The baseline campaign is not valid and must be repeated if the plant operates outside of the permitted range for more than 50% of the duration of the baseline campaign. The random check should be performed and the supporting data and evidences should be provided to the verification team. The information about the supplier of the primary gauze and its composition (for historic and baseline periods) was not available as no original documents (e.g. invoices) for the primary gauze suppliers were available during initial verification on-site. Such documentation must be provided to verifier. *Forward Action Request #1:* At the time of the first periodic verification invoices should be available for crosschecks in order to ensure that the primary gauze composition is remained unchanged over the historic campaigns and the baseline period. The specifications of the secondary catalyst have to be provided to the assessment team as well.	
C.2. Project boundaries *Check whether the project boundaries are still in compliance with the ones indicated by the PDD.*	24	The boundaries are the same as described in the PDD.	☑

C.3. Monitoring and metering systems *Check whether the required metering systems have been installed. The meters have to comply with appropriate quality standards applicable for the used technology.*	4, 5, 11, 12, 14	All measurement equipment is installed and works properly. However during the initial verification the TÜV SÜD verification team also indicated several mistakes in the data processing system, which leads to the confusing archived data (double nitric acid concentration calculation which leads to the error at the nitric acid production calculation). Furthermore it was not clear how the relevant data will be archived. The responsible persons were not informed about the calculation way within the appropriate software. *Forward Action Request #2*: TÜV SÜD assessment team recommended conducting the appropriate training of the responsible staff and developing the appropriate procedures. Moreover there is a need to provide a description of the data archiving management.	**FAR2**

C.4. Data uncertainty *How will data uncertainty be determined for later calculations of emission reductions? Is this in compliance with monitoring and metering equipment?*	16, 19	During the on-site verification PPs stated that the N2O-measurements required by EN 14181 (QAL 2) were performed by AIRTEC which is accredited due to EN 17025. As already mentioned above QAL 2 Report according EN14181 for Achema GP has been submitted to the assessment team. The assessment team confirms that the installation and the loops were checked and found to be correct. AST and QAL 2 have been performed by the AIRTEC. The report confirms a proper operation of the equipment. *Corrective Action Request #4:* The methodology requires determining the uncertainty/variability of the AMS given by the calibration experiment (EN 14181). The required inspection of the compliance with the calculated uncertainty is meant to deduct the uncertainty from the baseline emissions as the conservative approach. The uncertainty/variability of the AMS given by the calibration experiment must be parameterised into the data collecting and processing system in order to calculate the baseline emission factor.	**CAR4**

C.5. Calibration and quality assurance *Check how monitoring and metering systems are subject to calibration and quality assurance routines* *a) with installation* *b) during future operation*	10	As already mentioned above, the monitoring check as required by EN 14181 (QAL 2) were performed by a company AIRTEC. The flow-measurements required by EN 14181 (QAL 2) were performed by a company AIRTEC, too. The calibration and maintenance documents available on-site were not transparent enough. *Forward Action Request # 3:* Please elaborate a comprehensive list of all measuring equipment used as raw data for calculating the emission reduction. This list should include specific information e.g. internal number, serial number, methodology-specific number of parameter, ranges, calibration and /or adjustment period (last/next) and a reference to the underlying procedure.	**FAR3**

C.6. Data acquisition and data processing systems *Check the eligibility of used systems.*	4, 5, 11, 16, 17	During the on-site verification the data processing system at Achema nitric acid plant was not clear as no data flow chart was available. However after the on-site visit a very detailed data flow chart has been provided to the verifier. During the on-site inspection it could be verified that in case of malfunction there are some spare equipment available to install. However there was not any maintenance schedule available during the verification. PPs stated that any default values will be used by data collecting system Emi3000 in case of malfunctions or failures. It could not been verified as the Emi3000 system description was not available on-site. At the time on the on-site visit the QAL2 report was available. At the first periodic verification the results of the QAL2 must be taken into account. *Corrective Action Request #5:* Please provide a maintenance book/ modification book for the systems with all relevant parameters and calculations including the JI parameters. Please provide the detailed description of the data collecting systems installed, including the list of parameters, description of user defined functions, individual configurations for each parameter and underlying formulae. The results of the QAL 2 calibration must be taken into account and included in the configuration of the data collecting and processing system. A workbook for maintenance works should be provided. The maintenance work, malfunction, downtime of the measuring equipment must be considered and the default values must be applied accordingly. E.g. define a procedure for what to do with the	**CAR5**

		data during maintenance events (for instance, every week the reference gas is passed through the analyser). The criteria to determine the operation of the facility must be defined reasonable and clear to determine the operating hours. All of the above mentioned treatment of data should not affect or change the raw data base. The frequency of raw data collection can only be verified after providing the data flow chart and specifications of the data collecting and processing system.	
C.7. Reporting procedures *Check how reports with relevance for the later determination of emission reductions will be generated*		See G.1.	**FAR7**
C.8. Documented instructions *Check whether the personnel performing tasks with sensitivity for the monitoring of emission reductions have access and knowledge of documented instructions, forming a part of the project's management system.*		See G.1.	**FAR7**

C.9. Qualification and training *Check whether the personnel performing tasks with sensitivity for the monitoring of emission reductions has the appropriate competences, capabilities and qualifications to ensure the required data quality.*	14	During the on-site visit PP stated that a training program was performed in order to make the operational personnel aware of the JI – project and the related measures. However no evidence for the training was available on-site. Corrective Action Request #6: Confirmations of the trainings conducted should be provided to the assessment team. Furthermore the introduction of the monitoring system software must be ordered by Achema and conducted by the AMS provider to achieve that the personnel involved in the CDM project have the necessary competence to ensure the required data quality.	**CAR6**
C.10. Responsibilities *Check whether all tasks required to gather data and prepare a monitoring report with the necessary quality have been allocated to responsible employees.*	21	The responsibilities are clearly described in the PDD. However during the on-site visit auditors had the impression that the responsibilities from the JI perspective of the project are not clearly shared among the different departments. E.g. although the (possible) new N2O regulations is very important parameter for the project performance and must be monitored, it could not be assessed who is responsible of its monitoring at Achema nitric acid plant. Corrective Action Request #7: To ensure the correct, transparent and successful performance of this JI project all responsibilities must be defined clear and transparent and documented in written form in complete manner.	**CAR7**
C.11. Troubleshooting procedures *Check whether there are possibilities of redundant data monitoring in case of having problems with the used monitoring*	15	*Forward Action Request #4:* The troubleshooting procedures should be described clearly in the data handling protocol incl. definition of conservative assumptions and default values.	**FAR#4**

equipment. Such procedures may reduce risks for the buyers of emission reductions (e.g. the Client)			
D. Internal Data *Identifying the internal GHG data sources and ways in which the data have been collected, calculated, processed, aggregated and stored should be part of initial verification to assess accuracy and reliability of the internal GHG data..*			
D.1. Type and sources of internal data *Acquire information on type and source of internal GHG data, which is used in calculations of emission reductions. E.g.." continuous direct measurements", "site-specific correlations", "periodic direct measurements", "use of models" and/or "use of default emissions factors".*	5, 12, 15	*Forward Action Request #5:* A comprehensive presentation should be elaborated, thus it appears which data are archived by which source as well as the data flow from the acquisition to the final archiving including every step of processing.	**FAR5**
D.2. Data collection *How is data collected and processed? What are the means of quantifying emissions from the different data sources?*		See D.1.	**FAR5**

D.3. Quality assurance *Does internal data collection underlie sufficient quality assurance routines?*		*Forward Action Request #6:* To assure quality of the internal data additional documentation should be elaborated. This documentation should be very transparent and traceable, including all relevant data and performed manual changes of values Events out of routine as well as manually changed values should be mentioned as Daily Events. For the baseline and project campaigns criteria for daily events should be clearly defined and whether default values must be applied. Clearly define which default value will be applied according to the daily event, if applicable.	**FAR6**
D.4. Significance and reporting risks *Assess the significance and reporting risks related to the different internal data sources. Potential reporting risks may be related to the calculation methods, accuracy of data sources and data collection and/or the information systems from which data is obtained. The significance of and risks associated with the data source indicate the level of verification effort required at a later stage.*		After solving all findings mentioned in this checklist there is no reporting risk.	☑
E. External Data *Especially for data of baseline emissions there might be the necessity to include external data sources. The access to such data and a proof of data quality should be part of initial verification. If it is deemed to be necessary, an entity delivering such data should be audited.*			

E.1. Type and sources of external data *Acquire information on type and source of external data, which is used in calculations of emission reductions*		There are no external data used in calculations of emission reductions. The only information is given by the composition and the supplier of the gauzes.	☑
E.2. Access to external data *How is data transferred? How can reproducibility of data set be ensured?*		See E.1.	☑
E.3. Quality assurance *Does external data underlie any quality assurance routines?*		See E.1.	☑
E.4. Data uncertainty *Is it possible to assess the data uncertainty of external data? Are such routines included in reporting procedures?*		See E.1.	☑
E.5. Emergency procedures *Are there any procedures which will be applicable if there is no access to relevant external data?*		See E.1.	☑
F. Environmental and Social Indicators *A Monitoring Plan may comprise environmental and/or social indicators which could be necessary to monitor for the success of the project activity.*			
F.1. Implementation of measures *A project activity may demand for the installation of measures (e.g. filtering*	6, 21	Besides the already existing monitoring of the NOx-emissions there are no demands for the installation of measures due to environmental restrictions caused by the project activity.	☑

systems or compensation areas), which are exceeding the local legal requirements. A check of the implementation or realization of such measures should be part of the initial verification.		During the on-site visit it could be verified that the facility was in compliance with existing NOx regulations. In event of new NOx regulations over the crediting period the baseline scenario must be re- assessed and additionality of the project must be re- demonstrated as required by the AM0034.	
F.2. Monitoring equipment *Check where necessary whether the required metering systems have been installed. The meters have to comply with appropriate quality standards applicable for the used technology.*		See F.1	☑
F.3. Quality assurance procedures *What quality assurance procedures will be applied for such data?*		See comment to section G.1.	**FAR7**
F.4. External data *Check the quality, reproducibility and uncertainty of external data.*		No external data are required by the project activity.	☑
G. Management and Operational System *In order to ensure a successful operation of a Client project and the credibility and verifiability of the ERs achieved, the project must have a well defined management and operational system.*			

G.1. Documentation *The system should be documented by manuals and instructions for all procedures and routines with relevance to the quality of emission reductions. The accessibility of such documentations to persons working on the project has to be secured.*	15	*Forward Action Request #7:* At the time of the on-site visit the procedures were verified which are relevant for the quality of emission reductions. In order to optimize the process PPs agreed to implement so called data handling protocol which does summarize the single procedures and routines with relevance to the quality of emission reductions. The Quality assurance procedure for the NO-analyzer should be integrated in the data handling protocol. As a result of this Initial Verification a finalized protocol should be provided at least at the time of the first periodic verification.	**FAR7**
G.2. Qualification and training *The system should describe the requirements on qualification and the need of training programs for all persons working on the emission reduction project. Performed training programs and certificates should be archived by the system.*		See comments to C.9.	**CAR6**
G.3. Allocation of responsibilities *The allocation of responsibilities should be documented in written manner.*		See comments to C.10.	**CAR7**
G.4. Emergency procedures *The system should contain procedures which provide emergency concepts in case of unexpected problems with data access and/or data quality.*		See G.1.	**FAR7**

G.5. Data archiving *The system should provide routines for the archiving of all data which is required for verifying the project's performance in the context of consecutive verifications.*	1- 3, 8, 12, 15, 18	See also G.1. and C.6. The historical data was available only partially at the time of the on-site inspection. It could be verified that there are two storage devices at the nitric acid plant. However it was not clear how the data will be archived, as no description of the data storage system was available. At the DCS storage device only ammonia consumption will be recorded, but not nitric acid production, as data reports didn't need the NAP values before the implementation of the JI project. As NAP values are very important for the calculations of emissions and emission reductions, they must be recorded as well as other relevant according to the AM0034 requirements. At the first periodic verification it should be possible to look inside the data storage system, moreover as mentioned above data should be available for at least 2 years after crediting period. The necessary procedures should be defined and described in the MR. At the time of the on-site verification security of the achieved data was discussed. TÜV SÜD recommended saving the data on the hard disk, which will be secured then. *<u>Forward Action Request #8:</u>* The procedures for data archiving must be described in order to ensure that there are no data loses. The all relevant data must be stored for at least two years. The description of the data archiving for two data storage devices must be provided to the assessment team. NAP value must be included in the DCS system. The historical data for the last 4 campaigns must be provided in a clear, traceable and transparent manner. Furthermore the evidence information for gauze supplier and composition during the historic	**CAR5** **FAR7** **FAR8**

		campaigns, baseline campaign and project campaign must be provided as well as dismantling reports.	
G.6. Monitoring report *The system includes procedures for the calculation of emission reductions and the preparation of the monitoring report.*		The reporting of the emission reductions is allocated to the responsibility of the Nitric Acid Plant Manager. However see comments to C.10.	**CAR7**
G.7. Internal audits and management review *The system includes internal control procedures, which allow the identification and solution of problems at an early stage.*		*Forward Action Request #9:* After verification and after each reporting of emission reductions to the AIE, the Nitric Acid Plant Manager should organize a meeting with all staff involved in the execution of monitoring plan. The purpose of the meeting should be the internal data validation in order to ensure reliability of the reported emission reductions, identification of corrective actions in case and improvement of quality assurance procedures, identification of corrective actions in case and improvement of quality assurance procedures.	**FAR9**

Table 2: Resolution of Corrective Action, Forward Action and Clarification Requests

Clarifications, forward and corrective action requests by verification team	**Ref. to table 1**	**Summary of project owner response**	**Verification team Conclusion**
Clarification Request #1 A copy of the contract with the supplier of the secondary catalyst should be provided to the verification team A scheme where the single measuring devices are located should be provided. To identify the specific devices the internal number should be mentioned, too.	A.3.	Please find "Technical specifications for the secondary catalyst" (BASF) and revised MR v1.6 as supporting documents.	A copy of the contract with BASF (IRL 9), the supplier of the secondary catalyst, has been provided. The verification team checked the new MR ver. 1.6 (IRL 30) and found a clear explanation in Figure 2, page 5 and in Annex III of the same document for tag numbers. Also, during the site visit the scheme has been checked with the reality and no deviations found. **This finding is closed.**

Corrective Action Request #1: Please make sure that at least at the time of the first verification an alternative verifiable and conservative evaluation approach of the missing NAP values is possible.	C.1.	The standard procedure of NAP data collection and calculation as well as the alternative approach in case of NAP flow meter malfunction are described in JI Manual.	This issue has been extensively checked during the first periodic verification. For the period of 6 month (21.05 – 19.11.2008) when the HNO_3 flow meter was out of operation, the plant used the level meters from the storage tanks. In parallel, a mass balance theoretical calculation using AFR, ammonia conversion coefficient and absorption coefficient has been performed for plausibility check (IRL 27). The verification team asked for a parallel comparison of this approach with records of flow meter for May 2009 (IRL 28). The results proved that the approach used during the malfunction of flow meter was correct and conservative. **This finding is closed.**

Corrective Action Request #2: In order to ensure that operating conditions during the baseline campaign are representative of normal operating conditions, statistical tests should be performed to compare the average values of the permitted operating conditions with the average values obtained during the baseline determination period. Please provide these statistical tests to the verification team.	C.1.	Please find the answer in "Operational chart of baseline campaign.pdf".	Statistical tests have been provided to the verification team and checked (IRL 8). The conclusion was that operating conditions during the baseline is representative for normal operation conditions in AB ACHEMA. **This finding is closed.**
Corrective Action Request #3: The baseline campaign is not valid and must be repeated if the plant operates outside of the permitted range for more than 50% of the duration of the baseline campaign. The random check should be performed and the supporting data and evidences should be provided to the verification team.	C.1.	Please find the answer in "Operational chart of baseline campaign.pdf" and in excel calculation V4.0. 11-02-2010.xls.	Based on this excel files provided ("baseline calculation and evaluation V4.0. 11-02-2010.xls") (IRL 31) and the on-site verification of the data presented in the excel file it is confirmed that more than 50% of the values are within the permitted range hence the baseline is valid. **This finding is closed.**

Forward Action Request #1: At the time of the first periodic verification invoices should be available for crosschecks in order to ensure that the primary gauze composition is remained unchanged over the historic campaigns and the baseline period. The specifications of the secondary catalyst have to be provided to the assessment team as well.	C.1.	The provider of the primary gauze is the same for baseline and historic campaigns: Johnson Matthey.	These documents are confidential. The verification team had access to invoices for primary gauze for historic campaign/baseline during the on site visit. For the specifications of the secondary catalyst see the answer at CR#1. **This finding is closed.**
Forward Action Request #2: TÜV SÜD assessment team recommended conducting the appropriate training of the responsible staff and developing the appropriate procedures. Moreover there is a need to provide a description of the data archiving management.	C.3.	This information has been included in "GP JI manual. V2.0. 22-01-2010.pdf" and in the MR v1.6 as well.	The verification team received the documents regarding the staff involved in the JI Project, the responsibilities and the periodical training they perform (IRL 14). Also, during the site visit, TÜV SÜD assessment team checked their knowledge and was satisfied of the results. Data processing and archiving system, included also in MR (figure 3/page 6) has been checked during on site visit and found correct. **This finding is closed.**

Corrective Action Request #4: The methodology requires determining the uncertainty/variability of the AMS given by the calibration experiment (EN 14181). The required inspection of the compliance with the calculated uncertainty is meant to deduct the uncertainty from the baseline emissions as the conservative approach. The uncertainty/variability of the AMS given by the calibration experiment must be parameterised into the data collecting and processing system in order to calculate the baseline emission factor.	C.4.	Please find the answer in the AIRTEC documents "Calibration report - main part_Achema_GP-AIRTEC.pdf".	In order to determine the uncertainty/variability of the AMS, AB ACHEMA, hired AIRTEC Company for a QAL 2 calibration (IRL 36-41). The verification team checked the QAL 2 documents provided by AIRTEC. The calculation algorithm used in the data collecting and processing system has been also checked and was found that the new calibrations coefficients resulted after QAL 2 are used. The Excel calculations reflect these changes, as checked by the verification team. **This finding is closed.**

Forward Action Request # 3 Please elaborate a comprehensive list of all measuring equipment used as raw data for calculating the emission reduction. This list should include specific information e.g. internal number, serial number, methodology-specific number of parameter, ranges, calibration and /or adjustment period (last/next) and a reference to the underlying procedure.	C.5.	Please see the new MR v1.6 and calibration evidence for historical and baseline campaign.	The list has been created and provided to the assessment team during the first periodic verification. It is a table (included in Annex III of the MR) which includes all measuring equipment with tag, serial number, calibration (last/next), accuracy and type. Also during the on site visit the calibration certificates and correct installation for all measuring equipment has been checked and no mistakes found. See also answer to CAR#2* **This finding is closed.**

Corrective Action Request #5: Please provide a maintenance book/ modification book for the systems with all relevant parameters and calculations including the JI parameters. Please provide the detailed description of the data collecting systems installed, including the list of parameters, description of user defined functions, individual configurations for each parameter and underlying formulae. The results of the QAL 2 calibration must be taken into account and included in the configuration of the data collecting and processing system. A workbook for maintenance works should be provided. The maintenance work, malfunction, downtime of the measuring equipment must be considered and the default values must be applied accordingly. E.g. define a procedure for what to do with the data during maintenance events (for instance, every week the reference gas is passed through the analyser). The criteria to determine the operation of the facility must be defined reasonable and clear to determine the operating hours.	C.6.	Please check the new JI Manual, the new MR v1.6 and AIRTEC documents.	For maintenance book the list is provided ("Att.9 Maintenance and documentation book excel form.pdf") (IRL 42). This is a table with following columns: date/time, event/situation, what is done/based on what, name (who performed the intervention), comments. For troubleshooting/malfunction, there is another document (Att. No. 1) (IRL 43) which describe the procedure: parameter (monitoring parameters as included in AM0034), position (serial no.), breakdown/malfunction character, action performed, data used (in acc. To AM0034). Detailed description of the data collecting systems installed, including the list of parameters, description of user defined functions, individual configurations for each parameter and underlying formulae is

			presented in MR ver. 1.6. For QAL2, the answer has been provided in CAR#4. The operation of the facility is a parameter provided by the Control Room and, in case of "out of operation", automatically marked in CDMN2O program with "XNN". The verification team checked the above documents and cross-checked the information stored in the Control Room/manual records with the data from JI calculation program. **This finding is closed.**
Corrective Action Request #6: Confirmations of the trainings conducted should be provided to the assessment team. Furthermore the introduction of the monitoring system software must be ordered by Achema and conducted by the AMS provider to achieve that the personnel involved in the CDM project have the necessary competence to ensure the required data quality.	C.9.	JI Manual provide the answers to this CAR.	Documents provided and checked during the first periodic verification (IRL 14). **This finding is closed.**

<u>Corrective Action Request #7:</u> To ensure the correct, transparent and successful performance of this JI project all responsibilities must be defined clear and transparent and documented in written form in complete manner.	C.10	The new JI Manual and MR were reviewed to clearly respond to this CAR.	All responsibilities are defined clear and transparent in MR ver. 1.6. The overall responsibility is represented by the Technical Director of AB ACHEMA. The assessment team checked MR and found the tree diagram clear. **This finding is closed.**
<u>Forward Action Request #4:</u> The troubleshooting procedures should be described clearly in the data handling protocol incl. definition of conservative assumptions and default values.	C.11.	The procedures are included in the new JI Manual.	See also CAR#5 of the first periodic verification checklist. AB ACHEMA created a JI Manual (IRL 25) (an official document with registration no.), which includes also a sheet for registration of revisions. During the on site visit, the verification team checked the Manual and the revisions performed and found it complete. The Technical Manager of AB ACHEMA signed for the revisions. **This finding is closed.**

Forward Action Request #5: A comprehensive presentation should be elaborated, thus it appears which data are archived by which source as well as the data flow from the acquisition to the final archiving including every step of processing.	D.1.	Please find the answer in the new MR v1.6 and in JI Manual.	The presentation has been created and included in MR. There is a graphical presentation explaining which data are archived by which sources as well as the data flow from the acquisition to the final archiving including every step of processing. The assessment team checked also on site the correctness of the data flow and the archiving procedure and accepted it. **This finding is closed.**

Forward Action Request #6: To assure quality of the internal data additional documentation should be elaborated. This documentation should be very transparent and traceable, including all relevant data and performed manual changes of values Events out of routine as well as manually changed values should be mentioned as Daily Events. For the baseline and project campaigns criteria for daily events should be clearly defined and whether default values must be applied. Clearly define which default value will be applied according to the daily event, if applicable.	D.3.	Please check the new JI Manual and excel calculation files.	The following documents have been created: "Report of daily events GP plant" (IRL 44) in which every malfunction/unusual event is written (date/even/explanation). The second level is represented by "N2O Monitoring system troubleshooting procedure" (IRL 45) which describes the action undertaken to correct the problem and the ongoing impact on data collection. Finally only the Deputy Head of the Plant shall decide upon the way of data modification during calculations of baseline and project emissions in Excel file. The whole procedure is clear and all manually changed values are easy to identify. The assessment team performed cross checks starting with events from "Report of daily events GP plant", comparing with the records from "N2O

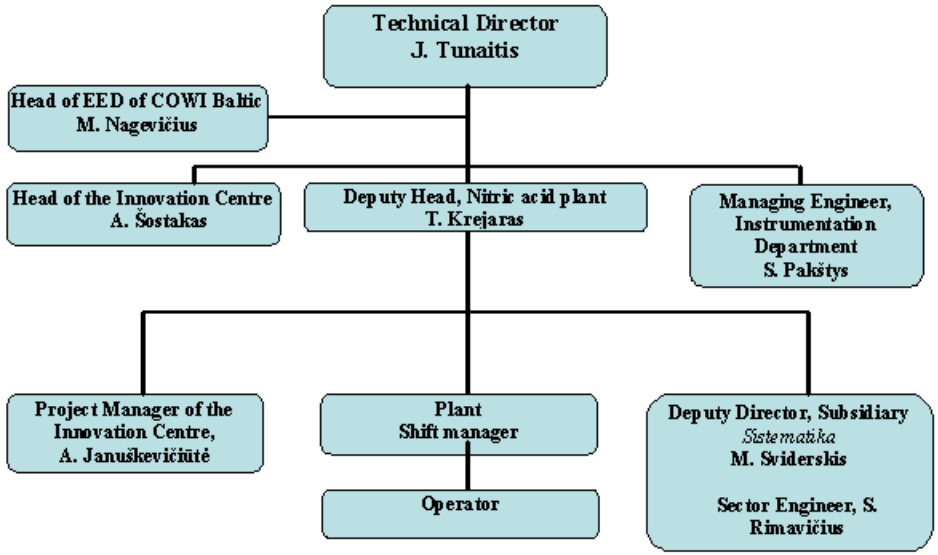
			Monitoring system troubleshooting procedure", checking also in "Daily maintenance and documentation book", and – in case of a failure in nitric acid flow meter – with data from DCS. Last step was the identification of the default value introduced in Excel calculations. The procedure, as verified, is solid, transparent and traceable. **This finding is closed.**
Forward Action Request #7: At the time of the on-site visit the procedures were verified which are relevant for the quality of emission reductions. In order to optimize the process PPs agreed to implement so called data handling protocol which does summarize the single procedures and routines with relevance to the quality of emission reductions. The Quality assurance procedure for the NO-analyzer should be integrated in the data handling protocol. As a result of this Initial Verification a finalized protocol should be provided at least at the time of the first periodic verification.	G.1.	Please check the new JI Manual.	The Quality assurance procedure for the NO-analyzer as well as the procedures cited above in FAR#6 are now included in the new GP JI Manual V2.0/22.01.2010 (IRL 25). The assessment team checked the Manual and found it appropriate. **This finding is closed.**

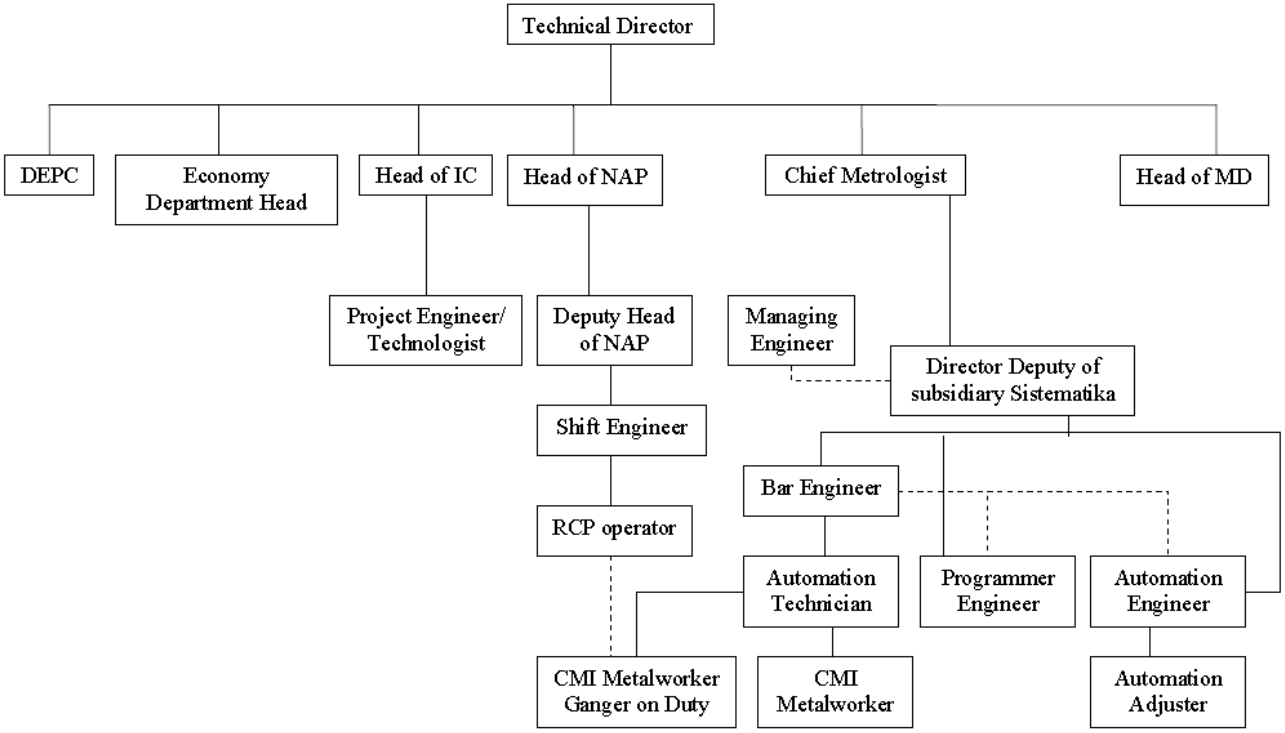
Forward Action Request #8: The procedures for data archiving must be described in order to ensure that there are no data loses. The all relevant data must be stored for at least two years. The description of the data archiving for two data storage devices must be provided to the assessment team. NAP value must be included in the DCS system. The historical data for the last 4 campaigns must be provided in a clear, traceable and transparent manner. Furthermore the evidence information for gauze supplier and composition during the historic campaigns, baseline campaign and project campaign must be provided as well as dismantling reports.	G.5.	Please find the answers in the new MR, the new JI Manual and in the documents provided as clarifications for the CARs above.	The procedures for data archiving is explained in FAR#5. All data are stored on two hard disks and on external support for two years. Data storage system has been checked during the on site visit and found correct. NAP value is included in DCS system as checked on site. Historical campaigns data starts with 01.04.2005. The document (IRL 8) has been provided to TÜV SÜD. Documents regarding gauze supplier and composition during the historic campaigns, baseline campaign and project campaign see (IRL 2), (IRL 1), (IRL 3). **This finding is closed.**

Forward Action Request #9: After verification and after each reporting of emission reductions to the AIE, the Nitric Acid Plant Manager should organize a meeting with all staff involved in the execution of monitoring plan. The purpose of the meeting should be the internal data validation in order to ensure reliability of the reported emission reductions, identification of corrective actions in case and improvement of quality assurance procedures.	G.7.	Please find the reports of the meetings in our internal documents related to QA/QC procedures.	This is a requirement of the internal quality system in place at AB ACHEMA - ISO 9001 and ISO 14001. **This finding is closed.**

Table 1: Data Management System/Controls

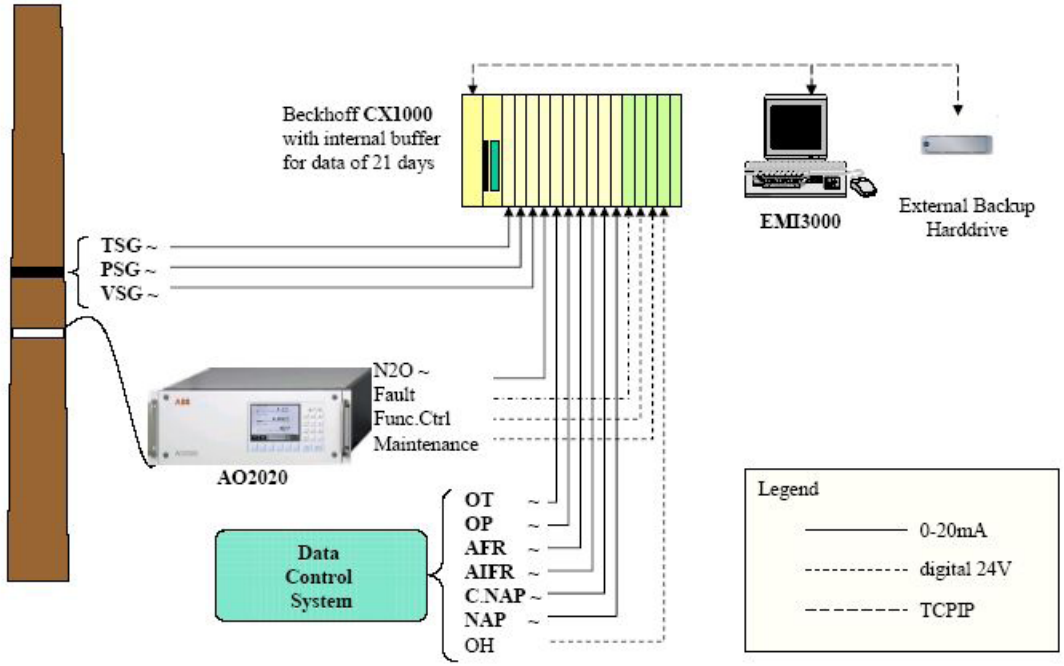
Expectations for GHG data management system / controls	**Score**	**Verifiers Comments (including *Forward Action Requests* or *Corrective Action Requests*)**
Defined organisational structure, responsibilities and competencies		
o Position and roles	Full	All positions and roles are described in the "JI Manual, ver 2" dated January 22nd 2010. The responsibilities for the project management are distributed as follows: The overall responsibility is represented by the Technical director of AB ACHEMA. The monitoring process is under the responsibility of the Nitric Acid Plant Deputy Head. The Nitric Acid Plant Deputy Head and Plant Shift Manager are responsible for data collection during the plant operation. The Nitric Acid Plant Deputy Head is in charge of programming all formulae in the spreadsheets which are used for calculation. The Plant Shift Managers process the data, check the data for consistency, validate and record it every day in electronic and paper form. In case of failure of monitoring equipment, staff of Subsidiary "Sistematika" is responsible for troubleshooting according to JI Procedures Manual "Troubleshooting Procedure". The Nitric Acid Plant Deputy Head adjusts the data according to the JI Project Manual for GP Plant. In case the failure is not covered by the procedure, the Nitric Acid Plant Deputy Head makes the decision to correct the figures or to abandon the data. The roles and responsibilities of other persons, which are represented in scheme, are provided below: Head of the Energy and Environment department (EED) of "COWI Baltic" is responsible for preparation of monitoring reports. The Managing Engineer of Instrumentation Department of AB ACHEMA is responsible for coordination of N2O monitoring-related issues. The Deputy Director of Subsidiary "Sistematika" is responsible for the control of the maintenance of the monitoring system, compliance with the operation rules for measurement and automation instruments, and for the analysis of the monitoring system failures. The Sector Engineer of Subsidiary "Sistematika" is responsible for assurance of correct operation of the monitoring system, for the arrangement of the compliance with QAL3 procedure, for preparation of

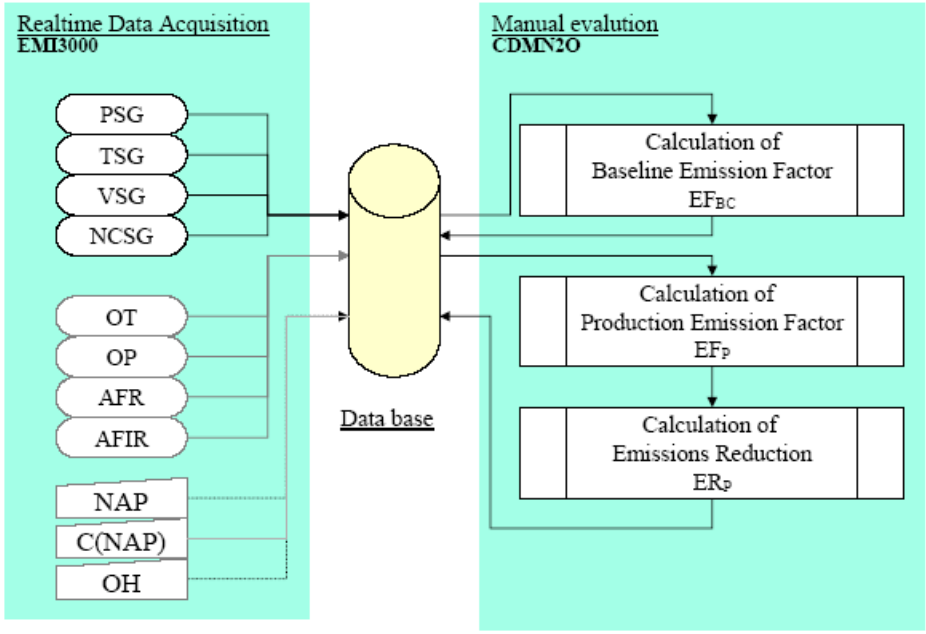
Expectations for GHG data management system / controls	Score	Verifiers Comments (including *Forward Action Requests* or *Corrective Action Requests*)
		manuals and internal maintenance procedures for the monitoring system, for keeping in touch with service providing organizations on the issues of monitoring system troubleshooting and maintenance. The Head of the Innovation Centre is responsible for coordination of the JI-Project-involved departments, for collaboration with JI partners, for control of funds for JI Project and he is contact person with JISC. The Project Manager of the Innovation Centre is responsible for arrangement of meetings, for conclusion of agreements, their coordination and fulfilment; he is also the contact person for project's correspondence. 

o Responsibilities	Full	A clear allocation of responsibilities has been established at the plant in regards to the monitoring of the JI project. The responsibilities of all other persons dealing with information and data required to prepare the monitoring report are clearly indicated and ruled by the internal quality management system and relevant service contracts respectively. 
o Competencies needed	Full	All competences and capabilities are covered by the persons working directly on the JI activity or having responsibilities to the JI activity. The operational procedures regarding management structure, responsibilities and training implemented at the nitric acid plant fulfil standard Integrated Management

		System norms (ISO 9001:2000, ISO 14001:2004).
Conformance with monitoring plan		
o Reporting procedures	Full	Plant Head Deputy is in charge for ER calculation. In addition the responsibilities of all involved personnel are defined in JI-Manual. The data management system and all reporting procedures reflect the monitoring plan completely.
o Necessary Changes	Full	No necessary changes were identified.
Application of GHG determination methods		
o Methods used	Partial	The calculation procedures reflect the monitoring plan completely. The verifier confirms that all algorithms are implemented as stated in the registered PDD. **Corrective Action Request #1:** Calculations of ERs conducted in AFRISO system as well as in excel sheet should be performed in accordance with EB 51 Annex 12 "*CLARIFICATION TO AM0034 (VERSION 02): CATALYTIC REDUCTION OF N2O INSIDE THE AMMONIA BURNER OF NITRIC ACID PLANTS***"**. Updated excel sheet with ER calculations should be provided to the assessment team. Information about the performed re-calculations should be clearly stated in the Monitoring Report.

o Information/process flow	Full	The first level of data control is provided by a Data Control System (DCS). This system (EMI-3000) is operated around the clock by staff in the control room. The second level of data control operates via a SCADA (Supervisory Control and Data Acquisition) system; Data from this system is accessible to the Technology Department Manager, the Nitric Acid Department Manager and the Nitric Acid Technologist via computer software. On a regular basis data exports from the system in excel are conducted. An additional automated monitoring system (AMS) has been installed using the guidance document EN 14181. Parameter information from the analysers and flow meters are fed into this data acquisition system. Here calculations are performed and hourly averages or the parameters are generated. The Emission Calculator (CDMN2O - AFRISO) provides separate readings for N2O concentration and gas volume flow continuously, generating average values for every 60 minutes of operation. Apart from these two parameters, temperature and pressure of the tail gas are recorded in the AMS. The applied software (CDMN2O) is adequate for complete documentation of AMS, drift and precision (QAL3) according to EN 14181. The maintenance procedures to the AMS are described in an AMS Manual. All data are stored in a MySql-database and thus available for further evaluation. It is also backed up in the external hard drive disc. From the data archive, the monitoring report extracts the essential data. Figure below illustrates the process flow:

		 Beckhoff CX1000 with internal buffer for data of 21 days EMI3000 External Backup Harddrive TSG ~ PSG ~ VSG ~ N2O ~ Fault Func.Ctrl Maintenance AO2020 Data Control System OT ~ OP ~ AFR ~ AIFR ~ C.NAP ~ NAP ~ OH Legend 0-20mA digital 24V TCPIP

o Data transfer	Partial	Plant Head Deputy is in charge with ER calculation. In addition the responsibilities are defined in JI-Manual. The calculation procedures take into account eventual downtime of the AMS: For down-time periods during baseline monitoring the lowest between the conservative IPCC values (4.5 kg N_2O/tHNO_3) or the last measured value will be applied. However, for the project campaign see CAR below. During the project lifetime, project participants collect and archive data on relevant parameters of the project on a regular basis. The following figure shows the data transfer: 

		Corrective Action Request #5: During the on-site verification it was assessed that in case of downtime of the N2O analyzer the highest measured value is serving as a default value in the project campaign. However according to AM0034 the highest emission factor of the project campaign must be applied as default value in such a case. The excel calculation sheet must be revised and the ERs must be re-calculated and reported accordingly
o Data trails	Partial	The monitoring report draw on procedures and instructions defined in the manual while compiling analysis information from the relevant monitoring periods. The monitoring reports thus include reporting on plant operation during the respective monitoring periods (focus on special occurrences with relevance to JI project), quality assurance (performed calibrations, QAL 3 procedures and other relevant data quality measures) as well as special events (providing explanation of unusual events, malfunctions, replacement of metering devices etc.). Furthermore the reports make transparent core data from calculation of emission reductions (derivation of baseline and project emissions and calculation of achieved emission reductions according to the manual), thereby also indicating relevant references to used data sources. **Corrective Action Request #6:** It was assessed randomly that during the baseline as well as during the monitoring period the results of QAL 3 of the N2O analyzer showed some span/ zero drift values to be out of the limit values (+/-3% of the measurement range), however no conservative corrections of the N2O values measured have been conducted. The necessary conservative corrections of the values measured should be conducted. The excel calculation sheet must be revised and the ERs must be re-calculated and reported accordingly. Furthermore please provide complete QAL 3 charts for the baseline campaign and the project campaign to the audit team.

Identification and maintenance of key process parameters		
o Identification of key parameters	Partial	The most critical parameters for the determination of GHG emissions are N2O measurement in the tail gas as the methodology require to use the guidance document EN14181, as well as the amount of nitric acid which has direct influence on the ERs calculation. **Clarification Request #6:** For the six months period of NAP flow meter breakdown a theoretical approach of NAP calculation was applied. In order to cross-check this approach, please provide a mass-balance taking into consideration AFR/Ammonia consumption as the basic input parameter. Furthermore a comparison between calculated NAP values (according to the alternative approach) and the values measured by the NAP flow meter should be provided for the period of May 2009 in order to cross-check the two different approaches
o Calibration/maintenance	Partial	Regular checks and calibrations are implemented by AB- ACHEMA. The table below presents the calibration status at the plant: The performance of the listed maintenance or calibration work, the consistency of the stated information with related documents, as well as the recommended period by the manufacturer were checked during the verification audit. It can be confirmed by the AIE that the given information is in compliance with the situation found on-site. To assure the effective calibration and maintenance, the TÜV SÜD assessment team reviews and crosschecks the calibration sheets and related calibration documents that must be generated by plant according to the ISO 9001 certification during the present Monitoring Period. Thanks to these documents TÜV SÜD assessment team can also confirm that the work has been done by people with the appropriate competences and qualifications. The correct performance of the quality assurance level QAL2 and QAL3 according to EN 14181 can be confirmed by the verifier by assessing the internal QAL3 demonstration of the control chart, the provided QAL2 report and the confirmation of an accredited lab due to DIN EN ISO/IEC 17025:2005. **Corrective Action Request #7:** Please correct the maintenance schedule by including correct maintenance periods according to

		manufactures specification or applied standards of all JI relevant equipment. Furthermore please create an adjustment/calibration plan for the whole monitoring period incl. baseline and provide it to the assessment team. MR should be amended by including the list of the relevant equipment, last and next calibrations. According to the alternative NAP data collecting approach, the flow meter FIQ 106 must be included in the existing QA/QC procedure and the maintenance schedule, too.
GHG Calculations		
o Use of estimates and default data	Partial	No estimates have to be used. In case of malfunction, downtime of the monitoring system or missing calibrations of measuring devices exactly procedures are described to determine default values. It can be confirmed that these procedures follow the requirements of the methodology exactly and were applied in the excel calculation sheets and data treatment correctly. However, **see CAR#5**

o Guidance on checks and reviews	Partial	AB ACHEMA plant has developed several procedures which are as aforementioned an integral part of the Integrated Management System norms (ISO 9001:2000, ISO 14001:2004). This procedure covers the aspect of internal audits for activities concerning the JI activity. The overall management system covers the issue of management review for all activities as required for system certification. **Corrective Action Request #2:** The Quality Assurance procedures as well as the troubleshooting procedures should be described in the JI Manual completely. The following improvements are required. 1. The JI Manual is thought as a living document which includes all improvements gained during the lifecycle of the project. Hence it is necessary that a well-defined identification number including revision number and date as well as the performed revisions must be indicated. 2. Procedures for troubleshooting about required actions (immediate and consecutive actions, improvements) in case of alarm settings, downtimes or malfunctions of metering systems or data losses as well as transparent descriptions of re-calculation and determinations of default values must be defined and described transparent. 3. Quality assurance procedures about internal data validation, preparing the monitoring report and related responsibilities in general (e.g. chart) as well as for each single step must be presented completely. 4. Information about NAP data collection and calculation must be included. This requirement includes the standard procedure as well as the alternative approach in case of NAP flow meter malfunction in a transparent manner
o Internal validation and verification	Partial	Internal validation and verification of the single process steps are defined on different levels in JI Manual. Related documents (minutes of meeting of the internal data validation) were checked by the verification team and it can be confirmed that periodical and serious reviews were performed. However, **see CAR#2**
o Data protection measures	Partial	The AIE can confirm that all assessments performed to check the figures stated in the excel calculation documents during the periodic verification audit are traceable to the raw data. It was assessed by the verifier that in case of using default values the requirements of the methodology were applied. **Corrective Action Request #8:**

		The calculations of the emission reductions are performed with the help on an excel calculation sheet. This excel sheet must be password protected whereas the permitted access must be clearly described e.g. in the JI manual. A version control as well as performed changes must be indicated and described. In addition a comprehensive summary of the daily events and a clear indication of any manual corrections performed - easily traceable to calculations must be included. Please insert also a legend with all abbreviations, colour codes used (for e.g. GNB, etc) and definitions of parameters. Used abbreviations should be consistent with the PDD. There are some inconsistencies in the name of the parameters: NCSG/NSCG. Please check the excel sheet for such kind of typos
o IT systems	Partial	The IT system is based on standard multi-user server systems and MS-office solutions. Concrete troubleshooting procedures have been defined. These specific measures are integrated into a comprehensive data manual which serves as the guidebook for documentation and monitoring procedures. Adequate templates for documentation on the maintenance and data control measures are compiled at weekly data control and documentation meetings. However, **see CAR#2**

Table 2: GHG calculation procedures and management control testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Potential reporting risks based on an assessment of the emission estimation procedures can be expected to occur in the following fields of action: 1. raw data collection 2. calculation methods Key source data applicable to the project assessed are hereby: • Metering records • Laboratory/analytical data • Accounting records. Appropriate calibration and maintenance of equipment resulting in a high accuracy of data supplied should be in place. It is hereby needed to focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weaknesses in the GHG calculation systems and may include: ➢ manual transfer of data/manual calculations ➢ position of metering equipment ➢ unclear origins of data ➢ accuracy due to technological limitations	Regarding the potential reporting risks identified in the left column the following mitigation measures have been observed during the document review and the on-site mission. *Calculation methods:* The use of excel files is requiring a detailed check of correct transfer of algorithms into this format and a carefully treatment of all "copy and paste" actions to avoid any overwriting of cells. *Provided Data and Processing:* *"*1st project line calculation and evaluation V4.0. 11-02-2010.xls". " baseline calculation and evaluation V4.0. 11-02-2010.xls" Detailed reviews of any excel spreadsheet of the documents for both – summary of baseline campaign data and the project campaign - have been performed. Any key parameters had been focused in special awareness. Any automatic and manual raw data entry and a proper use of correct default data had been proved. Detailed assessment of the applied formulae was performed. In general the new version provides all information transparently and correctly. *Moving average emission factor: N/A*	S**ee CARs, CRs above.**

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
	Minimum project emission factor: N/A *Composition and supplier of the primary catalyst* By assessing the delivery notes and the related specification of the composition it can be confirmed that ACHEMA plant used the same composition and supplier of the primary gauzes than in the baseline. The information presented in the Cat-Reports is correct. *Calibration and Maintenance:* All calibration and maintenance work have been performed as required either by the supplier and/or by the EN 14181 which was crosschecked by the provided relevant documentation including spot checks of serial- or tag numbers found on-site. *Accuracy:* All installed measuring devices are on a high level standard which was already confirmed in the initial verification report since no changes or modifications have been performed . There are no risks of missing information on data accuracy. The determined uncertainty is considered according to the methodology and was taken into account by reducing the baseline emission factor correctly.	

Table 3: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including *Forward Action Requests* and *Corrective Action Requests*)
The use of excel tools in the calculation requires further assessment.	All excel files used to deliver consolidated figures have been investigated excessively. The ways how new data are transferred to the excel sheet has been discussed in detail. For all relevant data sets spot checks with raw data have been taken and the correct transfer to the excel-files and their appropriate compilation has been checked.	**Clarification Request #3:** EMI 3000 - Graphs of all measured parameters for the baseline and first project campaign should be provided as transparent pdf-files. In addition the raw data for baseline campaign and the first project campaign should be provided as csv.data files.
Changing of quantitative domestic regulations concerning the project activity.	The JI project comprises some changes inside the ammonia oxidation reactors in order to prepare them for the placement of N_2O decomposition catalyst. The catalyst is delivered in the form of small star shaped extrudates which are filled into baskets beneath the primary catalyst gauze. This technical intervention at the existing oxidation reactors is not subject to registration or permission by the competent authorities, as it is not associated with any structural changes at the nitric acid plant or any other impacts on health, environment and safety.	**Clarification Request #1:** With regard to the N2O limit values indicated in the updated version of IPPC permit a comparison is necessary between the emission limit values for the respective monitoring period in order to demonstrate compliance with national legislation. It should be clearly evidenced that the emission limit value stated in the IPCC permit would not have been exceeded without installation of the secondary catalyst. If the comparison results in a higher N2O - emission level, the baseline (i.e. the emission factor of the baseline) must be amended accordingly. **Clarification Request #5:** As stated in the Environmental IPPC permit, there are ELVs for N_2O in the stack. For

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including *Forward Action Requests* and *Corrective Action Requests*)
		example in 2008 ELV was 104.98 g/s (or 1400 ppmv). During 2008 baseline period, for example on 18.04 hour 03:00 concentration was 3216.33 mg/m^3 and flow 142755.96 m^3/h. This leads to a N_2O concentration of 127.5 g/s. Please check the entire baseline period of 2008 and adjust $EF_{baseline}$.

Monitoring methodology	The monitoring system is in place according to the requirements of AM0034 and fulfills QA/QC assurance.	**Corrective Action Request #3:** The check if the plant operated during baseline campaign within the permitted operating ranges for temperature (OT) in the reactors was not performed correctly. The EMI 3000 system currently includes only the OT range for one of the four reactors. As described in the registered PDD correctly there are different OT ranges - one for each of the four burners - to be considered. This check must be corrected taking into account all 4 reactors. The revised check and the consequences to the validity of the baseline campaign (i.e. if the plant operated more than 50% in between the operational ranges) as well as the requirement to eliminate the N2O values during periods of running outside of the permitted range must be provided to the audit team. The Emission Reduction calculation sheet as well as the monitoring report must reflect the results. In addition the historical data used for establishing the permitted operating ranges of OT for each of the four reactors must be provided **Clarification Request #2:** During the on-site verification it was assessed that AFR_{max} in AFRISO system

		does not comply with that validated value as indicated in registered PDD. Even it was explained by the project participants that this was due to the use of different units, it should be evidenced that the validated value of AFR_{max} was applied correctly by the AFRISO system in order to eliminate N2O values which are above this maximum. ERs calculations and MR should be amended in case and provided to the assessment team

Monitoring Reports and ER calculation	The project campaign has been reassessed and a new document has been provided to the verification team.	**Corrective Action Request #4:** Please amend MR by including the information on normalization of the VSG values (flow meter in the stack) because the indications are not clear. In addition it is necessary to clarify the moisture content in the exhaust gas and the reason why it is not necessary to consider the water content in the calculation of the N2O mass flow by multiplying the N2O concentration (which is measured on a dry basis) and the volume flow. **Clarification Request #4:** A clarification is needed why the calculated amount of ER achieved in current monitoring period exceeds the amount estimated in the registered PDD. All differences in relation to the registered PDD and the reasons for that should be transparently explained. The revised monitoring report should include this information. **Corrective Action Request #9:** There is an inconsistency of the indicated year in MR (page 3). Please check and correct the MR.

Table 4: Compilation of open issues

Clarifications, forward and corrective action requests by verification team	Ref. to table 1	Summary of project owner response	Verification team Conclusion
Corrective Action Request #1: Calculations of ERs conducted in AFRISO system as well as in excel sheet should be performed in accordance with EB 51 Annex 12 "*CLARIFICATION TO AM0034 (VERSION 02): CATALYTIC REDUCTION OF N2O INSIDE THE AMMONIA BURNER OF NITRIC ACID PLANTS*". Updated excel sheet with ER calculations should be provided to the assessment team. Information about the performed re-calculations should be clearly stated in the Monitoring Report.		Excel sheet with ER calculations was updated in accordance with EB 51 Annex 12 "*CLARIFICATION TO AM0034 (VERSION 02): CATALYTIC REDUCTION OF N2O INSIDE THE AMMONIA BURNER OF NITRIC ACID PLANTS*". Because CL_n<$C_{Lnormal}$ therefore the values were eliminated for the parameter $NCSG_{BC}$ beyond the length of CL_n for calculating mean values for $NCSG_{BC}$. The baseline emissions (BE_{BC}) were recalculated by using this mean value multiplied by the mean value of the volume of stack gas (VSG_{BC}) and total operating hours (OH_{BC}) of the baseline campaign. For recalculation of the EF_{BL} the nitric acid production (NAP_{BC}) corresponding to the total operating hours of the baseline campaign length (OH_{BC}) was used. This information is provided in the chapter 2.5 of the Monitoring Report The following corrections were performed In excel sheets: a) In baseline calculation sheet an additional explanation was added about collection of NCSG values in AL and AM columns. In both columns	Calculations of ERs have been done correctly by reconsidering BE_{BC} and the information regarding this recalculation is clearly stated in MR (GP_Monitoring_report_v1.4_22-01-2010.pdf). Excel sheets have been updated also, however, in order to increase the transparency, the clarity and the relationship with the Methodology, some corrections are necessary to be done: a) Missing Formulas: formulas behind the values starting with the first line of the columns (for ex. columns AL, AM, BG etc.) b) The measurement units included in column's headers should be consistent with the corresponding values from

		NCSG values were transferred from other columns . A new column AL was created for NCSG values. Manually calculated NCSG values for downtime or maintenance periods are also included. Calculation of NCSG values during downtime or maintenance periods is performed in BH column and only for periods when the plant was in normal operating conditions (as stated in PDD). Manually calculated NCSG values from BH column are transferred to AL column and are colored in red. Other NCSG values are unchanged and are transferred from row data column AA. In columns BO-BS N2O concentration (g/s) is calculated for every hour. In case where N2O concentration was biger than ELV (104,98 g/s) as stated in IPPC permit, the NCSG values of 2008 year were recalculated according 104,98 g/s and applied in further calculations. Recalculated NCSG values were transferred to AM column. Also unchanged NCSG values from AL column were transferred to column AM. For 2008 the NCSG values were added to AM column by using logic formula (the formula applied from 2826 row). The BG column is not used in calculations. The header mark of BG column is uncolored	the cells (for ex. OH [h] in header and 3600 seconds in cells, etc). c) Clear definitions of the parameters extracted from AFRISO system (for ex. NCSG[L], NCSG[H], #NCSG, NCSG[ ] IR.v etc). Updated Excel calculations and MR (GP_Monitoring_report_v1.5_12-02-2010.pdf) were checked. **<u>This issue is closed.</u>**

		b) Measurement units of OH, and of NCSG valid counter were corrected in excel sheets of baseline and of project line calculations. c) A definition of the parameters extracted from Afriso system was added to excel sheets of baseline and of project line calculations: NCSG[L] low range: N2O concentration, mg/Nm3 #NCSG[L] low range: valid counter, s NCSG[H] high range: N2O concentration, mg/Nm3 #NCSG[H] high range: valid counter, s Chapter 2.1 of MR was corrected according to definitions used in excel sheets. All corrections were performed in the files: "baseline calculation and evaluation V4.0. 11-02-2010 ". "1st project line calculation and evaluation V4.0. 11-02-2010"	
Corrective Action Request #2: The Quality Assurance procedures as well as the troubleshooting procedures should be described in the JI Manual completely. The following improvements are required.		The Quality Assurance procedures as well as the troubleshooting procedures were updated and described in the JI Manual. The following improvements are implemented:	1. The updated version of JI Manual includes revision number, date and the nature of the revision. 2. The procedures for

1. The JI Manual is thought as a living document which includes all improvements gained during the lifecycle of the project. Hence it is necessary that a well-defined identification number including revision number and date as well as the performed revisions must be indicated. 2. Procedures for troubleshooting about required actions (immediate and consecutive actions, improvements) in case of alarm settings, downtimes or malfunctions of metering systems or data losses as well as transparent descriptions of re-calculation and determinations of default values must be defined and described transparent. 3. Quality assurance procedures about internal data validation, preparing the monitoring report and related responsibilities in general (e.g. chart) as well as for each single step must be presented completely. 4. Information about NAP data collection and calculation must be included. This requirement includes the standard procedure as well as the alternative approach in case of NAP flow meter malfunction in a transparent		1.The identification number including revision number and date as well as the performed revisions are indicated in the JI Manual V2. JI manual with annexes of JI manual is in file "GP JI manual. V2.0. 20-01-2010" 2. Procedures for troubleshooting about required actions in case of alarm settings, downtimes or malfunctions of metering systems or data losses were updated as well as descriptions of re-calculation and determinations of default values were defined and described in JI Manual. 3. Quality assurance procedures on internal data validation, preparation of the monitoring report and related responsibilities in general (scheme) as well as for each single step are presented in JI Manual. It is also included as annex I of the Monitoring Report. 4. The standard procedure of NAP data collection and calculation as well as the alternative approach in case of NAP flow meter malfunction are described in JI Manual.	troubleshooting, and triggered actions and responsibilities are clear and complete described in the updated JI Manual. 3. The overall responsibility (Technical director of AB ACHEMA) and shared tasks as well as QA procedures are clearly described in the updated JI Manual. 4. In case of downtime of flow meter for the production of nitric acid, the production of nitric acid is calculated in an alternative way, using storage tanks level and laboratory analyses. The complete procedure is described in a transparent manner in the updated JI Manual. The values are checked for plausibility using ammonia mass balances. The cross check performed by AIE for May 2009 (simultaneous measurements flow meter /alternative approach) showed that the alternative approach is correct and conservative.

manner.			**This issue is closed.**
Clarification Request #1: With regard to the N2O limit values indicated in the updated version of IPPC permit a comparison is necessary between the emission limit values for the respective monitoring period in order to demonstrate compliance with national legislation. It should be clearly evidenced that the emission limit value stated in the IPCC permit would not have been exceeded without installation of the secondary catalyst. If the comparison results in a higher N2O - emission level, the baseline (i.e. the emission factor of the baseline) must be amended accordingly.		A comparison was performed between N2O limit values indicated in the updated version of IPPC permit and the emission values for the monitoring period year 2008 and 2009 separately. Calculations are presented in the excel file "Comparing of N2O emissions with IPPC permit V2.0.CR1." For that purpose baseline emission factor EF_{BL} was multiplied by the total nitric acid production in year 2008 and 2009. Details of calculations are explained in CR#5. Official letter from enforcing authority is provided in files: Official letter from Local Authority_LT. CR1 Official letter from Local Authority_EN_12_02_2010. CR1	The document provided clearly demonstrates the compliance (baseline/project) with regard to ELV for a campaign production. However, there is another ELV included in the Environmental Permit, not related to nitric acid production but to instantaneous emission into the atmosphere: g/s. So called in the permit "one time value". In our understanding it's about two emission limit values: one regarding emission in t/year (the plant is in compliance) and another one, "one time value" in g/s with regard to what the verification team noticed exceeding during the baseline campaign. In order to clarify the environmental compliance situation of the plant (baseline/project), an official letter from enforcing authority is requested.

			According to official answer of Kaunas Regional Environmental Protection Department, valid measurements of emissions – performed by third party (Laboratory of State Analytical Control Department of the Ministry of Environment of the Republic of Lithuania) will be performed starting with 1st January 2013. One time exceeding recorded in 2008 shall not be subject to prosecution for the plant. The plant operated within the range of annual emission norm during the year 2008. **This issue is closed.**
Corrective Action Request #3: The check if the plant operated during baseline campaign within the permitted operating ranges for temperature (OT) in the reactors was not performed correctly. The EMI 3000 system currently includes only the OT range for one of the four reactors. As described in the registered PDD correctly		The following modification was made in the Excel file "baseline calculation and evaluation V3.0. 18-01-2010". The oxidation temperatures OT from all 4 reactors were included into the calculations. OT values of reactor No.1. were taken from EMI3000 system while OT values of reactors No.2, No.3, and No.4. were taken from DCS (Foxboro). N2O values outside normal operating conditions i.e.	Historical data for all 4 reactors have been provided. Excel calculation files and MR have been amended in order to reflect the permitted operating ranges for all four reactors. The plant operated in baseline campaign more than 50% of the time

there are different OT ranges - one for each of the four burners - to be considered. This check must be corrected taking into account all 4 reactors. The revised check and the consequences to the validity of the baseline campaign (i.e. if the plant operated more than 50% in between the operational ranges) as well as the requirement to eliminate the N2O values during periods of running outside of the permitted range must be provided to the audit team. The Emission Reduction calculation sheet as well as the monitoring report must reflect the results. In addition the historical data used for establishing the permitted operating ranges of OT for each of the four reactors must be provided.		outside OT permitted range presented in the PDD were eliminated. This information is provided in the chapter 1.2 of the Monitoring Report. Historical data of OT for each of the four reactors is presented in the file "GP_historical_data.CAR3".	(64%) inside the operating margins. **This issue is closed.**
Clarification Request #2: During the on-site verification it was assessed that AFR_{max} in AFRISO system does not comply with that validated value as indicated in registered PDD. Even it was explained by the project participants that this was due to the use of different units, it should be evidenced that the validated value of AFR_{max} was applied correctly by the AFRISO system in order to eliminate N2O values		According the historical data provided in the PDD AFRmax was set with units Nm3/h (15149,2 Nm3/h). In the EMI3000 system AFR values are monitored and stored with units kg/h. Therefore the AFRmax range is converted from Nm3/h in to kg/h by formula: 15149,2 *(17*1000 / 22,4 *1000) =11497,16 kg/h. 17(g/mol) – mole weight of ammonia 22,4 (mol/l) – volume of 1 mole The same conversion was used for AFRmin range:	AFRISO system records provided to AIE. MR as well as excel calculation files are using the correct AFR parameters. **This issue is closed.**

which are above this maximum. ERs calculations and MR should be amended in case and provided to the assessment team.		12679,4 *(17*1000 / 22,4 *1000) =9622,76 kg/h. ERs calculations are performed with units of AFR kg/h. This figure is used in excel calculations and in the monitoring software. This information is provided in the chapter 2.2 of the Monitoring Report.	
Corrective Action Request #4: Please amend MR by including the information on normalization of the VSG values (flow meter in the stack) because the indications are not clear. In addition it is necessary to clarify the moisture content in the exhaust gas and the reason why it is not necessary to consider the water content in the calculation of the N2O mass flow by multiplying the N2O concentration (which is measured on a dry basis) and the volume flow.		Monitoring Report provides information on normalization of the volume of stack gas (VSG) values. VSG is measured and recorded in to EMI3000 system every two seconds with units m3/h and in the same time VSG is normalized with PSG and TSG and is recorded with units Nm3/h every two seconds in EMI3000 system. In order to normalise VSG, PSG (hPa) and TSG (^{o}C) are measured and recorded every two seconds. In EMI3000 system normalization of VSG is performed by formula: VSG (Nm3/h)= VSG(m3/h)*273/(TSG+273)*PSG/1013 In the file "Material balance of stack gas flow. CAR4" the composition of stack gas (flow 507) is presented as it is provided in the operation registry of NAP of GP plant No.TR-122-39. According to material balance the moisture	The updated excel sheets and MR present information regarding raw data and normalization of VSG. EMI3000 records for raw data provided. This issue has been clarified. A moisture content of 0.53% in the flow gas is clear for AIE to conclude that the calculation is performed on a dry basis for both parameters. However, the gas analyze has been performed in summer (June 2009). In order to settle down the problem, it is requested an analysis performed in winter conditions also.

		content in the exhaust gas is 0.53 vol%. For a water content of 3,35 g H2O /kg gas (= 0.53 vol%) the dew point is -0.7 °C, while operating temperature in stack gas does not go below 22 °C. Due to negligible error it is not necessary to consider the water content in the calculation of the N2O concentration. This information is provided in the chapter 2.2 of the Monitoring Report. According to the technical project of GP plant – steam injection is not envisaged and not performed in any period. The data in the file "Material balance of stack gas flow. CAR4.jpg" dated 2004-12-06 is taken from GP plant's technical specifications. The composition of stack gas was calculated by the engineering company CEAMAG in charge of the GP plant design. The material balance is valid for a whole year i.e. for hot and cold periods.	A statement regarding potentially steam injection in the stack during winter conditions is requested also. The information provided is satisfactory. **This issue is closed.**
Corrective Action Request #5: During the on-site verification it was assessed that in case of downtime of the N2O analyzer the highest measured value is serving as a default value in the project campaign. However according to AM0034 the highest emission factor of the project		During downtimes of N2O analyzer the highest emission factor from whole project campaign was applied as a default value. ER was re-calculated accordingly in the updated file "1st project line calculation and evaluation V3.0. 18-01-2010".	The highest EF_P is calculated and excel sheets revised accordingly. See also CAR 1. The updated Excel calculation

campaign must be applied as default value in such a case. The excel calculation sheet must be revised and the ERs must be re-calculated and reported accordingly.		CAR1 was updated accordingly.	documents and MR were checked. **This issue is closed.**
Corrective Action Request #6: It was assessed randomly that during the baseline as well as during the monitoring period the results of QAL 3 of the N2O analyzer showed some span/ zero drift values to be out of the limit values (+/-3% of the measurement range), however no conservative corrections of the N2O values measured have been conducted. The necessary conservative corrections of the values measured should be conducted. The excel calculation sheet must be revised and the ERs must be re-calculated and reported accordingly. Furthermore please provide complete QAL 3 charts for the baseline campaign and the project campaign to the audit team.		During baseline period some results of N2O analyzer's calibration showed span drift values to be out of the limit values ±119 mg/Nm3 (±3,04% of the measurement range). In case after calibration of span N2O concentration increased more than 119 mg/Nm3, N2O values since the last calibration were unchanged, because during this period the N2O concentration was lower and it is a conservative approach. In case after calibration of span N2O concentration decreased more than 119 mg/Nm3, the difference of N2O concentration was deducted from NCSG values (values not calibrated with QAL2 coeff.) registered for period since the last calibration till current calibration. Modified NCSG values were calibrated with QAL2 coefficients and applied in further calculations. Re-calculation of EF_{BL} is in the file "baseline calculation and evaluation V3.0. 18-01-2010 ". ER was re-calculated accordingly in the updated file "1st project line calculation and evaluation	Excel calculation files were revised and ER amended accordingly. MR includes the new corrections performed. QAL3 charts and evaluations provided also. However, an official confirmation from an accredited entity (AIRTEC) sustaining ±3,04% range is requested. **This issue is closed.**

		V3.0. 18-01-2010" Please find QAL3 data from EMI system in files: "drift_evaluation_graphs_baseline.CAR6" "drift_evaluation_graphs_projectline.CAR6" "GP_N2O_QAL3_evaluation091008.CAR6" "GP_N2O_ drift_evaluation.CAR6" Dimension ± 3,04 % is stated in Chapter 8.1.10 of Guideline VDI 3950: The drift between the calibrations dt shall be ≤ 3,04 % of measuring range. Our measuring range is 2000 ppm. dt ≤ 60,8 ppm = 119 mg/m3.	
Corrective Action Request #7: Please correct the maintenance schedule by including correct maintenance periods according to manufactures specification or applied standards of all JI relevant equipment. Furthermore please create an adjustment/calibration plan for the whole monitoring period incl. baseline and provide it to the assessment team. MR should be amended by including the list of the relevant equipment, last and next calibrations. According to the alternative NAP data collecting approach, the flow meter FIQ 106 must be included in the existing QA/QC		The maintenance schedule was updated including correct maintenance periods according to manufactures specifications and applied standards of all JI relevant equipment. The adjustment/calibration plan for the whole monitoring period incl. baseline has been created and included as an Annex in JI Manual. MR has been amended by including the list of the relevant equipment, last and next calibrations. According to the alternative NAP data collecting approach, the flow meter FIQ 106 has been included in the existing QA/QC procedure, troubleshooting procedure, maintenance schedule	MR and updated JI Manual include all metering devices used in JI Project. Calibration performed by Laboratory of Metrology JS "Achema" (Accredited body). However, a new column shall be added to the table regarding legal requirements for periodicity calibration of the meters. In ATT. No. 6, PY 02301 is for pressure not for temperature as written in the table. These typos shall be corrected.

procedure and the maintenance schedule, too.		and calibration plan. This information is provided as annexes II and III of the Monitoring Report. The amended table in the Annex III of the MR includes a new column on legal requirements for periodicity calibration of the meters. Calibration plan of N2O measuring system of GP (attachment no 11 of JI manual) was also updated accordingly. File "Att.No.11. Calibration plan GP_ v1.1 CAR7" An error in PY 02301 was corrected in the table of attachment No. 6 of JI manual. File "Att.6. List of metering devices used within AM0034 v1.0 CAR7.pdf"	Documents checked and the amendments are considered satisfactory. **This issue is closed.**
Clarification Request #3: EMI 3000 - Graphs of all measured parameters for the baseline and first project campaign should be provided as transparent pdf-files. In addition the raw data for baseline campaign and the first project campaign should be provided as csv.data files.		Graphs of all measured parameters in EMI3000 system during baseline and first project campaign are provided in the following files: "Achema.GP JI. operation charts of baseline campaign.CR3" "Achema.GP JI. operation charts of 1 project campaign.CR3" The raw data for baseline campaign and the first project campaign are in file "Achema.GP JI.details data of baseline and project campaigns.CR3"	EMI 3000 – Graphs and .csv files have been provided. The verification team checked them for consistency with the excel calculation and didn't notice any discrepancies. **This issue is closed.**
Clarification Request #4: A clarification is needed why the calculated		Calculated amount of ER in current monitoring period exceeds the amount estimated in the registered PDD due to 2 reasons:	The information provided is considered relevant. However, a comparison (%),

amount of ER achieved in current monitoring period exceeds the amount estimated in the registered PDD. All differences in relation to the registered PDD and the reasons for that should be transparently explained. The revised monitoring report should include this information.		1. higher efficiency of the secondary catalyst than projected 2. lack of precise N_2O concentration measurements at the pre-project phase The projected efficiency of the secondary catalyst was at the level of 80% N_2O abatement. This figure was used as a conservative approach, based on the minimum efficiency guaranteed by the manufacturer. The actual efficiency during the project campaign has reached 88%. In order to project N_2O emission reductions, a stationary analyser SICK-Mayhak UNOR 6N (infrared) was used to measure N_2O concentration in the tail gas flow in April 2007. At that time, measurement results gave short term average N_2O concentration of 2119,16 mg/Nm^3, which translated into 7,07 kg/tHNO_3. The actual concentration ($NCSG_{mean95\%}$) during the baseline campaign, after the proper monitoring was 2640 mg/Nm^3 and emission factor was 8,8 kg/tHNO_3. This resulted 21% lower projected ER compared to the actual ER of the 1st project campaign: $ER = (EF_{BI} - EF_P) * NAP_P * GWP_{N2O}$	between ER estimated ex-ante and ER achieved is missing. The explanation is considered satisfactory. **<u>This issue is closed.</u>**

		$ER_{Projected}$ = (0.00707 – 0.001414) * 330000 * 310 = 578608.8 t CO2 ER_{Actual} = (0.008821 – 0.001083) * 291805.31 * 310 = 699973.80 t CO2 Comments: * For projected emission reductions, EF_P was calculated based on projected efficiency of the secondary catalyst of 80% i.e. 20% of the projected EF_{BI} which results in 0.001414. ** Projected emissions in the PDD were calculated on a yearly basis not for campaigns therefore comparison presented here is illustrative. Calculations are presented in the file: "Comparison of projected and actual ER - CR#4". Explanation is also added to chapter 3.3 of the Monitoring Report. Since initial measurements back in 2007 were performed during only one week's time it is likely that the time was to short to precisely define emission values. Also, the purpose of the measurements at that time was to get some data in order to make a forecast for future project	

		emissions but not to perform precise calculations. These reasons resulted in lower ER forecast than it proved to be the reality. This information is provided in the chapter 3.3 of the Monitoring Report	
Corrective Action Request #8: The calculations of the emission reductions are performed with the help on an excel calculation sheet. This excel sheet must be password protected whereas the permitted access must be clearly described e.g. in the JI manual. A version control as well as performed changes must be indicated and described. In addition a comprehensive summary of the daily events and a clear indication of any manual corrections performed - easily traceable to calculations must be included. Please insert also a legend with all abbreviations, colour codes used (for e.g. GNB, etc) and definitions of parameters. Used abbreviations should be consistent with the PDD. There are some inconsistencies in the name of the parameters: NCSG/NSCG. Please check the excel sheet for such kind of typos.		The excel file of emission reduction calculations is password protected, the permitted access is described in JI manual V2. A revision list with indicated file versions and dates of performed changes is created in the excel file of emission reduction calculations. The sheet "downtime of AMS" lists all registered daily events (shutdowns, downtimes, troubles) and includes explanation of manually performed correction in the calculations. All abbreviations of data marking are explained in the sheet "evaluation". The inconsistencies of the parameter names are corrected too. The above mentioned changes performed in the files: "1st project line calculation and evaluation V3.0. 18-01-2010" "baseline calculation and evaluation V3.0. 18-01-2010 " Explanation added to CAR 1.	Updated version has been provided. The assessment team can confirm that the calculations performed are correct, however **see CAR 1 above.** CAR 1 settled, so: **This issue is closed.**

Clarification Request #5: As stated in the Environmental IPPC permit, there are ELVs for N_2O in the stack. For example in 2008 ELV was 104.98 g/s (or 1400 ppmv). During 2008 baseline period, for example on 18.04 hour 03:00 concentration was 3216.33 mg/m^3 and flow 142755.96 m^3/h. This leads to a N_2O concentration of 127.5 g/s. Please check the entire baseline period of 2008 and adjust $EF_{baseline}$.		During 2008 baseline period in case if N2O concentration was bigger than ELV (104,98 g/s) as stated in IPPC permit, the NCSG values of 2008 year exceeding this limit were reduced to 104,98 g/s and applied in further calculations. Re-calculation of EF_{BL} is in the file "baseline calculation and evaluation V3.0. 18-01-2010 ". ER was re-calculated accordingly in the updated file "1st project line calculation and evaluation V3.0. 18-01-2010" Explanation added to CR1.	Excel files provided and $EF_{baseline}$ adjusted accordingly, however, **See CR 1 above.** CAR 1 settled, so: **This issue is closed.**
Corrective Action Request #9: There is an inconsistency of the indicated year in MR (page 3). Please check and correct the MR.		The date of the start of the first project campaign was corrected in the monitoring report – 2008 is written instead of 2009 year.	The starting date has been corrected in MR. **This issue is closed.**
Clarification Request #6: For the six months period of NAP flow meter breakdown a theoretical approach of NAP calculation was applied. In order to cross-check this approach, please provide a mass-balance taking into consideration AFR/Ammonia consumption as the basic input parameter. Furthermore a comparison between		For the period from 21.05.2008 until 19.11.2008 the cross-check calculations of NAP for baseline and first project campaign are separately performed. Calculations are performed considering the AFR/Ammonia consumption in the reactor, ammonia conversion coefficient and absorption coefficient. The calculations are presented in the file: "GP JI. Cross-check of NAP by massbalance.CR6"	The alternative approach has been provided. The description is clear and understandable. Mass balance used as plausibility check is also consistent with the values. The assessment team received also the cross-check performed for baseline and project and found no inconsistencies. See

calculated NAP values (according to the alternative approach) and the values measured by the NAP flow meter should be provided for the period of May 2009 in order to cross-check the two different approaches.		A comparison between calculated NAP values (according to the alternative approach) and the values measured by the NAP flow meter for the period of May 2009 is in the file "GP_HNO3_0905 data for crosscheck of NAP.CR6"	also comments to CAR 2. Cross-check Baseline, 21.05.2008, h=01. theoretical = 38.09; Excel = 39.12 Project, 8.08.2008, h=01. theoretical = 32.46; Excel = 32.21 Comparison: 01.05. 2009: alternative approach = 38.29, flow meter = 39.2 **This issue is closed.**

Document Requests from Initial Verification	Project owner comment	Sufficient or not

Document Requests from First Periodic Verification	Project owner comment	Audit team conclusion
Outstanding document(s) #**1**: It's necessary to provide sufficient hard proof	The calculation and consideration of the NAP value is implemented in the calculation tool in a transparent way. This	☑

reg. NAP production for cross check.	data can be cross-checked with the submitted files: " GP_HNO3_0905 data for crosscheck of NAP.CR6.xls" and " GP JI. Cross-check of NAP by massbalance.CR6.xls"	
Outstanding document(s) #**2**: It's necessary to provide sufficient hard proof regarding Environmental compliance during Baseline/Project	The document has been provided and checked. Starting with 2013, REPA will perform spot measurements in stack for emission compliance. Until than the the compliance is checked on an yearly basis. The cited document is: " Official letter form Local Authority_EN_12_02_2010. CR1.pdf"	☑
Outstanding document(s) #**3**: It is necessary to provide to the verifier sufficient hard proof(s) – example wise – for the cross-check of special daily events and double check of its maintenance / data proceeding and calculation in the EXCEL spreadsheets. *e.g. SCADA data for special events via Excel*	Daily events and the respective treatment of data in the calculation sheets can be cross-checked on a simple and transparent basis. An example generally illustrates this by bringing together data from the continuous daily events protocol, the csv-files and integrated data of the calculation tools. Please refer to document: "Achema.GP JI baseline details data 11-12-2009.csv" and "Achema.GP JI. 1 project campaign details data 11-12-2009.csv"	☑
Outstanding document(s) #**4**: It's necessary to provide an updated *JI manual* (living document) containing all improvements done as compared to the registered MP by emphasising of the reasonability and conservativeness of changes/alterations undertaken.	The JI Manual has been revised. The revision ver2.0/22.01.2010 outlines all improvements with justifications/ description of conservativeness given. Please refer to: "GP JI manual. V2.0. 22-01-2010.pdf"	☑

Table 4* Issues raised after first CB review

Clarification and Corrective Action Requests by CB	Summary of project owner response	Audit team conclusion
Clarification Request #1*: During baseline campaign, the graphs of AFR, NAP and VSG have more or less similarity. However the graph of VSG during project campaign indicate considerable drop at the last 1/3 while AFR was constantly supplied. An explanation is required.	During project campaign in summer time air compressor produced lower amount of air. To keep the same or very similar capacity of the plant we reduced the amount of secondary air. Because of that AFR approximately was in the same range, but due to lower amount of secondary air, total amount of VSG was lower at the last 1/3 of project campaign. Please find the graph of secondary air flow in the attached file "*graphs_1st_PC with explanation*". There you can see the changes of secondary air flow during summer time 2009. The data are from DCS Foxboro (IRL 46).	The verification team checked the document and confirms that the explanation is correct. **This issue is closed.**
Corrective Action Request #1*: In the Monitoring Report v1.5 dated 08.04.2010, it is mentioned methodology AM 0034 v3.3, but in the Determination Report it is mentioned methodology AM 0034 v0.2. Correction is required.	In the monitoring report we corrected the version number of methodology AM0034 in file *"GP_Monitoring_report_v1 6_14-04-2010".*	The verification team checked the new MR v1.6. **This issue is closed.**
Clarification Request #2*: Information about calibration history around baseline campaign and project campaign is needed. Please submit all applicable records.	The calibration evidences for 2007-2008 years in following files: OT_calibration_evidence.zip, OP_calibration_evidence.zip, NAP_calibration_evidence.zip, AFR_calibration_evidence.zip and AIFR_calibration_evidence.zip. (IRL 47).	The verification team checked the documents provided. **See CR 1** below.**

Table 4** Issues raised after second CB review

Clarification and Corrective Action Requests by CB	Summary of project owner response	Audit team conclusion
Corrective Action Request #1:** The EF used for downtimes of N2O analyzer during project campaign – 3.607 kg N2O/t HNO3 applied looks to be an abnormal value, i.e. abnormally high (too conservative) Instead of this, in case of downtime of the N2O, the highest EF can be chosen amongst the data in 95% interval (after filtering). Correction is needed.	In case of downtime of the N2Oanalyzer we applied the highest value amongst the NCSG data in 95 % interval. The highest value is 2.8474 kgN2O/tHNO3. We recalculated the EF. Please find calculation files V.5 and corrected monitoring report V.1.7.	The new MR v1.7, dated 20.04.2010 and new calculation file, "1st project line calculation and evaluation V5.0. 20-04-2010.xls" provided were reviewed by the verifier. The new EF has been used. **This issue is closed.**
PP answer to CR 2*: **"**Acc to First Periodic Verification Checklist (CAR 7) a new column 12 has been added to the Annex III indicating legal requirements for periodicity calibration of the meters. Unfortunately these calibration intervals were taken based on "Order of director of State Metrology Service V-178", which doesn't covers the technological measurements and not always coinsist with the real calibration	Answer regarding comment (r1) The mentioned paragraph means that "Order No. V-178 director of Lithuanian State Metrology Service regarding intervals of time between the validation for instruments assigned the legal metrology" establishes the calibrations intervals only for legal measurements (related with safety, health etc.) . For emission related measurements like NCSG, VSG, PSG, TSG the calibration intervals are kept according to this order too. The calibration intervals for customary technological measurements are set by the Metrological Service of Achema, based on experience and manuals of equipment.	The verification team checked the documents provided: "passport_9-1380_2.2.jpg (IRL 49)" and "factory_calibration_protocol _9-1641.jpg" (IRL 49). The information provided is considered satisfactory **This issue is closed.**

Clarification and Corrective Action Requests by CB	Summary of project owner response	Audit team conclusion
intervals". The calibration of emission related measurements (NCSG, VSG, PSG and TSG) is performed yearly, conforming with requirements for legal metrology acc to "Order No.V-178 of director of State Metrology Service". **Clarification Request #1**:** As the baseline campaign started in Sep. 2007 and the monitoring period is 16/08/2008 to 26/09/2009 , we usually have to check all the applicable calibration records appropriate for that period incl. baseline and project campaign about NAP. Therefore, 2007-2008 is not sufficient. For OT, OP, AF, AIFR, we do not need to see calibration records for project campaigns. **comment [r1]:** If the calibration frequency did not comply with the applicable national requirements, please consider to take conservative approach.	From 2007.09 till now the NAP measurements equipment was calibrated in the folowing way: 1. Corriolis Mass flowmetter serial No. 410293, Passport No 9-1380. Device used for NAP measurements from the start of baseline till 21.05.2008. Last calibration was performed 12.09.2006 .Calibration interval for such measurements acc. to Lithuanian requirements for legal metrology is 2 years-not oversteped. See record of positive bench calibration result :file: passport_9-1380_2.2.jpg. 2. Corriolis Mass flowmetter serial No. 12035303, Passport No 9-1641. Installed from 28.11.2008. Calibration was performed 18.10.2008 .Calibration interval for such measurements acc. to Lithuanian requirements for legal metrology is 2 years-not overstepped. See factory calibration protocol file: factory_calibration_protocol_9-1641.jpg. Answer regarding comment (r2) Depending on measuring principle and purpose of device additional bench or site verification and calibration are performed by accredited "Laboratory of metrology of Achema" in intervals indicated in Annexes II and III of MR. AST tests are performed for AMS by an accredited testing Laboratory (AIRTEC) in comply with EN14181.	

Clarification and Corrective Action Requests by CB	Summary of project owner response	Audit team conclusion
comment [r2]: Does this mean AST, Annual Surveillance Test to comply with EN14181? Explanation is needed.		

Annex 2: Information Reference List

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
0	On-site interviews were conducted on 28 - 29 October 2008 and 20-21 October 2009 in Kaunas, Lithuania at AB Achema by auditing team of TÜV SÜD **Determination Team:** Mr. Konrad Tausche TÜV SÜD, GHG Auditor, Assessment Team Leader Ms. Olena Maslova TÜV SÜD GHG Auditor, Project manager Mr. Constantin Zaharia GHG Auditor trainee **Interviewed persons at AB Achema:** Mr. Juozas Tunaitis AB Achema, Technical Director Mr. Ramunas Pilsudskas AB Achema, Chief of nitric acid plant Mr. Stasys Pakstys AB Achema, instrumentation department, Managing engineer Ms. Ausra Januskeviciute AB Achema, innovation centre, Project manager Mr. Tomas Krejaras AB Achema, Deputy chief of nitric acid plant Ms. Kristina Jezotcenko AB Achema, Engineer for technical information and translations Mr. Ratmiras Voglius Sistematika, Automation engineer Mr. Stanislavas Rimavicuis Sistematika, Sector engineer Mr. Martynas Nagevicius COWI Lietuva UAB, Director BU Environment and Energy Dr. Iven Clausen BASF SE, Business Development CDM/JI, Project manager Mr. Andreas Wölfert BASF SE, Technology manager JI projects			
1	20.01.2008	Information about the gauze supplier and composition for the baseline campaign	Achema	
2	12.11.2008	Information about the gauze supplier and composition for the last historic campaign	Achema	

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
3	20.01.2008	Information about the gauze supplier and composition for the project campaign	Achema	
4	05.01.2009	Introduction/ description of the monitoring system (description of mass flow meter for NAP measurement, Foxboro system (DCS) incl. formulas and polynoms, data processing within EMI system)	BASF	
5	04.02.2009	Data flow chart	Achema	Delivered
6	19.01.2008	IPPC permit incl. NOx regulations and NOx values for the period 2007- 2008	Achema	
7		Installation dismantling reports and reception protocols for the historic campaigns	COWI	
8	19.01.2009	Hard proofs for the relevant data of the historic campaigns	Achema	
9		Technical specifications for the secondary catalyst	BASF	
10		List of metering equipment incl. QAL 3 and other quality assurance procedures, calibration periods, local and internal requirements, responsible authorities (internal and external) with underlying evidence documentation	Achema	
11		Detailed description of the AFRISO system incl. all relevant specific parameters and underlying formulae.	AFRISO/ BASF	
12		Summary about Data Archiving (storage of EMI data and selected data from DCS, e.g. tank level, NH3 consumption)	Achema	
13		Work instructions incl. internal calibration procedure within QAL	Achema	

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
		3		
14		Evidence documentation for conducted trainings of responsible staff at AB Achema	Achema	
15	19.01.2008	The data handling protocol with trouble shooting procedures incl. a list of the spare equipment	Achema	
16	02.10.2008	QAL 2 report for the relevant metering equipment	Achema	
17		Maintenance and documentation book	Achema	
18	05.12.2008	NAP calculation sheet and explanations	Achema	
19	29.06.2007	Declaration of conformity: Measurement Instrumentation- Test results of conformity with the methodology AM0034	ABB Automation GmbH	
20	24.01.2006	Material Safety data sheet for the secondary catalyst installed	BASF SE	
21		Official notification of the Mr. Kastanauskas' membership at Environmental Protection Committee of Lithuanian Confederation of Industrialists		
22	16.01.2008	Loop diagrams of mass flow meter for NAP measurement	Achema	
23		Letter of Approval, issued on 08.07.2008 by the Ministry of the Environment of Lithuania	Achema	
24		Final PDD v. 10, dated 12.12.2008	Consultant, Achema	
25	22/01/2010	GP JI manual. V2.0. 22-01-2010.pdf	Achema	

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
26	12/02/2010	Official letter form Local Authority_EN_12_02_2010. CR1.pdf	REPA, Kaunas	
27	23/01/2010	GP JI. Cross-check of NAP by massbalance.CR6.xls	Achema	
28	23/01/2010	GP_HNO3_0905 data for crosscheck of NAP.CR6.xls	Achema	
29	23/01/2010	Material balance of stack gas flow. CAR4.jpg	Achema	
30	12/02/2010	GP_Monitoring_report_v1.5_12-02-2010.pdf	Achema	
31	12/02/2010	" 1st project line calculation and evaluation V4.0. 11-02-2010.xls" and *" baseline calculation and evaluation V4.0. 11-02-2010.xls"*	Achema	
32	12/02/2010	DCS Print Screens weekly basis starting with 05.09.2007 " Achema.GP JI baseline details data 11-12-2009.csv" and "Achema.GP JI. 1 project campaign details data 11-12-2009.csv"	Achema	
33	12/02/2010	- Scheme with measurement devices and all calibration certificates via GP_*Monitoring_Report_v_1,5.pdf*	Achema	
34/35	12/02/2010	Published and Final JI Monitoring Report for the reporting period #1: August 08, 2008 – september 26, 2009 of " Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertiliser Factory, Lithuania,", issued on 14 April 2009-2 Links: - unfccc/ji-sc website - netinform website	Achema	
36	09/09/2008	Calibration report - main part_Achema_GP-AIRTEC.pdf	Achema	QAL 2

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
37	09/09/2008	Calibration report - N2O_Achema_line_GP-AIRTEC.pdf	Achema	QAL 2
38	09/09/2008	Calibration report - pressure_Achema_line_GP-AIRTEC.pdf	Achema	QAL 2
39	09/09/2008	Calibration report - temperature_Achema_line_GP-AIRTEC.pdf	Achema	QAL 2
40	09/09/2008	Calibration report - Volume flow_Achema_line_GP-AIRTEC.pdf	Achema	QAL 2
41	22.01.2010	Att.9 Maintenance and documentation book excel form.pdf	Achema	
42	22.01.2010	Att. No. 1 GP N2O Monitoring system troubleshooting procedure_kor 2101 01 18g.pdf	Achema	
43	22.01.2010	Att. 8 Report of daily events GP plant.pdf	Achema	
44	09/09/2008	Calibration report - main part_Achema_GP-AIRTEC.pdf	Achema	
45	14.04.2010	Graphs_1st_PC with explanation.xls	Achema	
46	14.04.2010	AFR, AIFR, NAP, OP, OT calibration evidence: historical, baseline and project campaigns.	Achema	
47	20.04.2010	1st project line calculation and evaluation V5.0. 20-04-2010.xls	Achema	
48	20.04.2010	GP_Monitoring_report_v1 7_20-04-2010.pdf	Achema	
49	20.04.2010	factory_calibration_protocol_9-1641.jpg, passport_9-1380_2.1.jpg, passport_9-1380_2.2.jpg, passport_9-1641_2.1.jpg	Achema	