JI VERIFICATION REPORT

- 3RD.1 PERIOD –

BOREALIS PEC-RHIN SAS

BOREALIS PEC RHIN N_2O ABATEMENT PROJECT

ITL PROJECT ID : FR1000212

Monitoring Period: 2012-01-01 TO 2012-11-18
(incl. both days)

Report No: 8000413932.1 12/539

Date: 2012-12-07

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Verification Report:	***Report No.***	***Rev. No.***	***Date of 1st issue:***	***Date of this rev.***
	8000413932 12/539	0	2012-12-07	2012-12-07
Project:	***Title:***		***Registration date:***	***UNFCCC-No.:***
	Borealis Pec Rhin N_2O abatement project		2010-12-30	FR1000212
Project Participant(s):	***Host party:***		***Other involved parties:***	
	France		Belgium	
Applied methodology/ies:	***Title:***		***No.:***	***Scope:***
	Project specific methodology: *'Catalytic reduction of N_2O at nitric acid plants'*		N/A	5
Monitoring:	***Monitoring period (MP):***		***No. of days:***	***MP No.***
	2012-01-01 to 2012-12-31- both days included • Subperiod 3.1: 2012-01.01 – 2012-11-18		323	3.1
Monitoring report:	***Title:***		***Draft version:***	***Final version:***
	Borealis Pec Rhin N_2O abatement project		2012-11-01	2012-12-05 (Ver. 3)
Verification team / Technical Review and Final Approval	***Verification Team:***		***Technical review:***	***Final approval:***
	Ulrich Walter Sabine Meyer		Susanne Pasch Rainer Winter	Rainer Winter
Emission reductions: [t CO_{2e}]	***Verified amount***		***As per Draft MR:***	***As per PDD:***
	75,024		69,668	79,709 V.01 (304 d) 84,412 V.02 (323 d)

Summary of Verification Opinion:	Borealis PEC-Rhin SAS. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 3rd periodic verification of the project: "Borealis Pec Rhin N_2O Abatement Project", with regard to the relevant requirements for JI (Track 1) project activities. The project reduces GHG emissions due to reduction of N_2O emissions. This verification covers the sub-period 3.1 from 2012-01-01 to 2012-11-18 (including both days). In the course of the verification 5 Corrective Action Requests (CAR) and 0 Clarification Requests (CL) were raised and successfully closed. Furthermore. The verification is based on the draft monitoring report, revised monitoring report, and the monitoring plan as set out in the registered PDD, the determination report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant. As a result of this verification, the verifier confirms that: • all operations of the project are implemented and installed as planned and described in the project design document. • the monitoring plan is in accordance with the applied country specific methodology: Méthode pour les Projets Domestiques: "Réduction catalytique du N_2O dans des usines d'acide nitrique". • the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately. • the monitoring system is in place and functional. The project has generated GHG emission reductions. As the result of the 3rd.1 periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows: Emission reductions: **75,024** t CO_2e in subperiod 3.1 Including a deduction to 90% according to the Arrêté du 2 mars 2007.	
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Abbreviations:

AIE	**Accredited Independent Entity**
AMS	**Automated Measuring System**
AST	**Annual Surveillance Test**
CA	**Corrective Action / Clarification Action**
CAR	**Corrective Action Request**
CDM	**Clean Development Mechanism**
CL	**Clarification Request**
CO_2	**Carbon dioxide**
CO_2eq	**Carbon dioxide equivalent**
DVM	**Determination and Verification Manual**
DCS	**Data Collection System**
ER	**Emission Reduction**
ERU	**Emission Reduction Units**
FAR	**Forward Action Request**
GHG	**Greenhouse gas(es)**
HNO_3	**Nitric Acid**
JI	**Joint Implementation**
MMD	**Measurement and Monitoring Devices**
MP	**Monitoring Plan**
MR	**Monitoring Report**
N_2O	**Nitrous Oxide**
PCS	**Process Control System**
PDD	**Project Design Document**
PP	**Project Participant**
QA/QC	**Quality Assurance / Quality Control**
UNFCCC	**United Nations Framework Convention on Climate Change**
XLS	**Emission Reduction Calculation Spread Sheet**

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1. INTRODUCTION

Borealis PEC-Rhin SAS has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 3rd periodic verification of the project

"Borealis Pec Rhin N_2O abatement project"

with regard to the relevant requirements for JI (Track 1) project activities.

Remark:

Due to the reporting of a change of shareholder of the plant, the French DFP issued a letter/LOA/

- involving Borealis PEC-Rhin SAS instead of PecRhin S.A. as project participant and
- renaming the project from
  - "Pec Rhin N_2O abatement project" to
  - "Borealis Pec Rhin N_2O abatement project" (these are the English translations).

Belgium as investor state accepted this renaming of the PP/MAIL/ and confirmed the validity of the original LoA.

The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered JI project number FR1000212[1].

GHG data for the monitoring period covering 2011-01-01 to 2012-12-31 has been divided into 2 subperiods:

- Subperiod 3.1: 2012-01-01 – 2012-11-18,
- Subperiod 3.2: 2012-11-19 – 2012-12-31

In this version of the report, the first subperiod 3.1 has been verified in detailed manner applying the set of requirements, audit practices and principles as required under the Determination and Verification Manual /DVM/ of the UNFCCC.

The

- Subperiod 3.2: 2012-11-19 – 2012-12-31

will be verified in a separate report after end of the monitoring period. This approach was accepted by the French DFP/conmail/.

1) http://ji.unfccc.int/JIITLProject/DB/PK2RRNV3FP1DC3D5UK4CYF3XOSIGJR/details

1.1. Objective

The objective of the verification is the review and ex-post determination by an independent entity of the GHG emission reductions. It includes the verification of the:

- implementation and operation of the project activity as given in the PDD,
- compliance with applied approved monitoring plan,
- data given in the monitoring report by checking the monitoring records, the emissions reduction calculation and supporting evidence,
- accuracy of the monitoring equipment,
- quality of evidence,
- significance of reporting risks and risks of material misstatements.

1.2. Scope

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

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

- Article 6 of the Kyoto Protocol /KP/,
- guidelines for the implementation of Article 6 of the Kyoto Protocol as presented in the Marrakech Accords under decision 9/CMP.1 /MA/, and subsequent decisions made by the JISC and COP/MOP,
- other relevant rules, including the host country legislation,
- JI Validation and Verification Manual /DVM/,
- monitoring plan as given in the registered PDD /PDD/,
- Projet Domestique Methodology: “Catalytic reduction of N_2O at nitric acid plants “ Méthode pour les Projets Domestiques: “Réduction catalytique du N_2O dans des usines d'acide nitrique”

2. GHG PROJECT DESCRIPTION

2.1. Project Characteristics

Essential data of the project is presented in the following Table 2-1.

Table 2-1: Project Characteristics

Item	Data		
Project title	Borealis Pec Rhin N_2O abatement project		
JI Track	☒ Track 1	☐ Track 2	☐ JPA
Project size	☒ Large Scale	☐ Small Scale	
JI Approach	☒ JI Specific Approach	☐ Approved CDM Methodology	
Project Scope *(according to UNFCCC sectoral scope numbers for CDM)*	☐	1	Energy Industries (renewable- /non-renewable sources)
	☐	2	Energy distribution
	☐	3	Energy demand
	☐	4	Manufacturing industries
	☒	5	Chemical industry
	☐	6	Construction
	☐	7	Transport
	☐	8	Mining/Mineral production
	☐	9	Metal production
	☐	10	Fugitive emissions from fuels (solid, oil and gas)
	☐	11	Fugitive emissions from production and consumption of halocarbons and hexafluoride
	☐	12	Solvents use
	☐	13	Waste handling and disposal
	☐	14	Land-use, land-use change and forestry
	☐	15	Agriculture
Methodology:	*Projet Domestique Methodology: "Catalytic reduction of N_2O at nitric acid plants"*		
Technical Area(s):	5.1: N_2O		
ITL Project ID No.:	FR1000212		
Crediting period	☐ Renewable Crediting Period (7 y) ☒ Fixed Crediting Period (2 y, 4m)		

2.2. Project Verification History

Essential events since the registration of the project are presented in the following Table 2-2.

Table 2-2: Project verification history

#	Item	Time	Status
1	Date of registration	2010-12-30[2]	-
2	Start of crediting period	2010-09-01	-

2 Date of registration is the date of issuing date of the LoA by the DFP. This could be later than the start of the crediting period since the French rules allows retrocrediting (Start of the crediting period is at latest 2 months after submission of the registration documents to the French DFP which can be earlier than the issuing date of the LoA).

#	Item	Time	Status
3	1st Monitoring period	2010-09-01 to 2011-02-15	Verified
4	2nd Monitoring period	2011-02-16 to 2011-12-31	Verified
5	3rd Monitoring period 2012-01-01 – 2012-31-12 • Subperiod 3.1: 2012-01-01 – 2012-11-18	2012-01-01 to 2012-11-18	Matter of this verification

2.3. Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity (Table 2-3).

Table 2-3: Project Parties and project participants

Characteristic	Party	Project Participant
Host party	France	Borealis PEC-Rhin SAS N.serve Environmental Services GmbH
Other Involved Party/ies	Belgium	Borealis PEC-Rhin SAS

2.4. Project Location

The details of the project location are given in table 2-4:

Table 2-4: Project Location

No.	Project Location
Host Country:	France
Region	North Eastern (Alsace), Département: Haut Rhin
Project location address	Borealis PEC-Rhin SAS Zone Industrielle Mulhouse Rhin 68490 Ottmarsheim
Plant coordinates	Coordinates: Plant tail gas stack: Lat: 47°47'30.27"N Long: 7°31'20.90"E Ammonia burner: Lat: 47°47'30.49"N Long: 7°31'19.91"E

2.5. Technical Project Description

The project activity aims to reduce levels of N_2O emissions from the production of nitric acid with a secondary N_2O abatement technology: the project involves the installation of a secondary N_2O reduction catalyst at the nitric acid production plant.

The emission reductions are a result of the catalytic decomposition of nitrous oxide. Nitrous oxide which is formed as by-product of the nitric acid production will be removed by the catalyst installed below the standard precious metal gauze pack in the ammonia burner. The nitrous oxide would otherwise be emitted as part of the tail gas of the nitric acid plant to the atmosphere.

The key parameters for the project are given in table 2-5:

Table 2-5: Technical data of the plant

Parameter	Unit	Value
Number of burners (identical)		2
Manufacturer	-	OSCHATZ
Diameter	mm	3960
Start of commercial production	-	2005 (1970 first installation)
Operating conditions as per specifications (trip point values)		
- Temperature (min/max):	℃	740 - 920
- Pressure (max):	Bar abs	4.6
- Ammonia to Air ratio (max)	Vol.-%	>11.8
Ammonia Oxidation Catalyst		
Manufacturer	-	Johnson Matthey Plc
Type	-	Eco-Cat-Pack
Composition:	-	Pt/Rh/Pd
Absorber		
Design capacity per day (100 %)	t/d	1,100
Design capacity per day (legal)	t/d	1,100
Annual production (design)	t/year	393,800
Annual production (practice)	t/year	345,000
Secondary Catalyst		
Manufacturer	-	YARA, supplied by Johnson Matthey Plc
Type	-	YARA abatement catalyst
Composition:	-	Cobalt with CeO_2 as support material
Design efficiency N_2O reduction	%	85-95
N_2O Analyzer (stack)		
Manufacturer	-	Thermo Scientific
Type	-	Nicolet 6700
Measurement Principle	-	FT-IR
Stack volume flow rate measurement		
Manufacturer	-	Endress+Hauser
Type	-	Deltatop measuring probe with Deltabar difference pressure meter
Measurement Principle	-	Difference pressure (dynamic pressure)

3. METHODOLOGY AND VERIFICATION SEQUENCE

3.1. Verification Steps

The verification consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Publication of the monitoring report
- A desk review of the Monitoring Report /MR/ submitted by the client and additional supporting documents with the use of customised verification protocol /CPM/ according to the Determination and Verification Manual /DVM/,
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting
- Resolution of corrective actions (if any)
- Final verification reporting
- Technical review
- Final approval of the verification.

The sequence of the verification is given in the table 3.1 below:

Table 3.1: Verification sequence

Topic	Time
Assignment of verification	2012-10-03
On-site-visit	2012-11-20
Draft reporting finalised	2012-11-21
Final reporting finalised	2012-12-07
Technical review finalised	2012-12-07

3.2. Contract review

To assure that

- the project falls within the scopes for which accreditation is held,
- the necessary competences to carry out the verification can be provided,

- Impartiality issues are clear and in line with the CDM accreditation requirements

a contract review was carried out before the contract was signed.

3.3. Appointment of team members and technical reviewers

On the basis of a competence analysis and individual availabilities a verification team, consistent of one team leader and 1 additional team member, was appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 3-1 below.

Table 3-3: Involved Personnel

	Name	Company	Function [1]	Qualification Status [2]	Scheme competence [3]	Technical competence [4]	Verification competence [5]	Host country Competence	On-site visit
☒ Mr. ☐ Ms.	Ulrich Walter	TÜV Nord Cert GmbH	TL [A]	LA	☒	5.1	☒	☐	☒
☐ Mr. ☒ Ms.	Sabine Meyer	TÜV NORD Cert GmbH	TM [A]	LA	☒		☒	☒	☐
☐ Mr. ☒ Ms.	Susanne Pasch	TÜV NORD Cert GmbH	TR [B]	LA	☒		☒	☐	-
☒ Mr. ☐ Ms.	Rainer Winter	TÜV Nord Cert GmbH	TR, FA [B]	SA	☒	5.1	☒	☐	-

1) TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

2) GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

3) GHG auditor status (at least Assessor)

4) As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, …)

5) In case of verification projects

A) Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

B) No team member

3.4. Publication of the Monitoring Report

In accordance with decision 9/CMP.1 (§ 36) the draft monitoring report, as received from the project participants, has been made publicly available on the TÜV NORD Website www.global-warming.de during a 30 days period from 2012-11-01 to 2012-12-01[3]. Comments received are taken into account in the course of the verification, if applicable.

3.5. Verification Planning

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

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

Risk analysis and detailed audit testing planning

For the identification of potential reporting risks and the necessary detailed audit testing procedures for residual risk areas table A-1 is used. The structure and content of this table is given in table 3-2 below.

Table 3-5: Table A-1; Identification of verification risk areas

Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing				
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**	**Additional verification testing performed**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)**
The following potential risks were identified and divided and structured according to the possible areas of occurrence.	*The potential risks of raw data generation have been identified in the course of the monitoring system implementation. The following measures were taken in order to minimize the corresponding risks.* *The following measures are*	*Despite the measures implemented in order to reduce the occurrence probability the following residual risks remain and have to be addressed in the course of every verification.*	*The additional verification testing performed is described. Testing may include:* - *Sample cross checking of manual transfers of data* - *Recalculation* - *Spreadsheet 'walk throughs' to check links and equations* - *Inspection of calibration and*	*Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties are highlighted.*

[3] http://www.global-warming.de/e/2034/

Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing				
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**	**Additional verification testing performed**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)**
	implemented:		*maintenance records for key equipment* - *Check sampling analysis results* *Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.*	

The completed table A-1 is enclosed in the annex 1 (table A-1) to this report.

Project specific periodic verification checklist

In order to ensure transparency and consideration of all relevant assessment criteria, a project specific verification protocol has been developed. The protocol shows, in a transparent manner, criteria and requirements, means and results of the verification. The verification protocol serves the following purposes:

- It organises, details and clarifies the requirements a JI project is expected to meet for verification
- It ensures a transparent verification process where the verifying AIE documents how a particular requirement has been proved and the result of the verification.

The basic structure of this project specific verification protocol for the periodic verification is described in table 3-3.

Table 3-5: Structure of the project specific periodic verification checklist

Table A-2: Periodic verification checklist						
No.	***DVM[4] paragraph / Checklist Item*** *(incl. guidance for the determination team)*	***Initial Finding*** *(Means and results of assessment)*	***Ref.***	***Action requested to project participant*** *(CAR, CL, FAR)*	***Review of PP´s action***	***Conclusion***
Number of the checklist item	*The section gives a reference to the relevant paragraph of the DVM. The checklist items are linked to the various requirements the project should meet. The checklist is organised in various sections. Each section is then further subdivided as per the requirements of the topic and the individual project activity.*	*The section is used to elaborate and discuss the checklist item in detail. It includes the initial assessment of the verification team and how the assessment was carried out.*	*Gives reference to the information source on which the assessment is based on.*	*Assessment based on evidence provided if the criterion is not fulfilled a CAR, CL or FAR (details of each finding are elaborated in chapter 4) is raised otherwise no action is requested. The assessment refers to the draft verification stage.*	*Assessment based on the project participant action in response to the raised CAR, CL or FAR (details of each finding are elaborated in chapter 4). The assessment refers to the final verification stage.*	*Final assessment at the final verification stage is given.*

The periodic verification checklist (verification protocol) is the backbone of the complete verification starting from the desk review until final assessment. Detailed assessments and findings are discussed within this checklist and not necessarily repeated in the main text of this report.

The completed verification protocol is enclosed in the annex (table A-2) to this report.

3.6. Desk review

During the desk review all documents initially provided by the client and publicly available documents relevant for the verification were reviewed. The main documents are listed below:

[4] JISC 19 Annex 4

- the last revision of the PDD including the monitoring plan/PDD/,
- the last revision of the determination report/DET/,
- the monitoring report, including the claimed emission reductions for the project/MR/,
- the emission reduction calculation spreadsheet/XLS/.

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

3.7. On-site assessment

As most essential part of the verification exercise it is indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include, but are not limited to:

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

The complete verification team attended the site visit.

Before and during the on-site visit the verification team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

Representatives of the Borealis PEC-Rhin Nitric Acid Plant and N.serve including the operational staff of the plant were interviewed. The main topics of the interviews are summarised in Table 3-4.

Table 3-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel, Borealis PEC-Rhin Nitric Acid	- General aspects of the project - Technical equipment and operation - Changes since validation

Interviewed Persons / Entities	Interview topics
Plant	- Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring and measurement equipment - Maintenance
2. Consultant, N.serve	- Remaining issues from the last verification - Monitoring data management - Data uncertainty and residual risks - GHG emission reduction calculation - Procedural aspects of the verification - Environmental aspect

3.8. Draft verification reporting

On the basis of the desk review, the on-site visit, follow-up interviews and further background investigation the verification protocol is completed. This protocol together with a general project and procedural description of the verification and a detailed list of the verification findings form the draft verification report. This report is sent to the client for resolution of raised CARs, CLs and FARs.

3.9. Resolution of CARs, CLs and FARs

Non-conformities raised during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, if:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- Issues identified in a FAR during validation or previous verifications requiring actions by the project participants to be verified during verification have not been resolved.

The verification team uses the term Clarification Request (CL), which is be issued if:

- information is insufficient or not clear enough to determine whether the applicable JI requirements have been met.

Forward Action Requests (FAR) indicate essential risks for further periodic verifications. Forward Action Requests are issued, if:

- the monitoring and reporting require attention and / or adjustment for the next verification period.

For a detailed list of all CARs, CLs and FARs raised in the course of the verification pl. refer to chapter 4.

3.10. Final reporting

Upon successful closure of all raised CARs and CLs the final verification report including a positive verification opinion can be issued. In case not all essential issues could finally be resolved, a final report including a negative verification opinion is issued.

The final report summarizes the final assessments w.r.t. all applicable criteria.

3.11. Technical review

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

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

3.12. Final approval

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

After this step the request for issuance can be started.

4. VERIFICATION FINDINGS

In the following paragraphs the findings from the desk review of the monitoring report/MR/, the calculation spreadsheet/XLS/, PDD/PDD/, the Determination Report/DET/ and other supporting documents, as well as from the on-site assessment and the interviews are summarised.

The summary of CAR, CL and FAR issued are shown in Table 4-1:

Table 4-1: Summary of CAR, CL and FAR

Verification topic	No. of CAR	No. of CL	No. of FAR
A – Project Approvals	2	0	0
B – Project Implementation	1	0	0
C – Monitoring Plan Compliance	1	0	0
D – Monitoring Plan Revision	0	0	0
E – Data Management	1	0	0
SUM	**5**	**0**	**0**

The following tables include all raised CARs, CLs and FARs and the assessments of the same by the verification team. For an in depth evaluation of all verification items it should be referred to the verification protocols (see Annex).

Finding:	**CAR A1**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	It must be checked at each verification, that the total amount of verified emission reductions until 2012-12-31 does not exceed the limit of 351,440 tonnes (before 10 % reduction) according to the host country LoA.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	*N/A*		
AIE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and AIE assessments (#2, #3, etc.) shall be added.*	OK. The assessment has been done in Table 5.7: Relevant data and outcome of ER-calculation for the subperiod 3.1. It can be confirmed that the number of ERUs are below the cap at the end of subperiod 3.1. To ensure that ERUs generated in subperiod 3.2 do not		

Finding:	CAR A1
	exceed the LoA cap, a second assessment round #2 has been started.
Corrective Action #2 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	*N/A*
AIE Assessment #2 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and AIE assessments (#2, #3, etc.) shall be added.*	
Conclusion *Tick the appropriate checkbox*	☒ To be checked during the next periodic verification ☐ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	CAR A2		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The name of the plant has been changed. 1. As stated in the letter of the French DFP issued on 2012-11-05 the name of the project in the project documentation has not been changed accordingly. Table 2.1: 2. The name of the plant as project participant of the host country has not been updated. 3. The name of the plant as project participant of the investor country has not been updated. 4. No evidences from the investor country regarding the change of the name of the project participant have been provided so far.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	*1. The name of the project in the MR has now been updated accordingly.* *Table 2.1:* *2. The name of the plant as PP of the host country has now been updated* *3. The name of the plant as PP of the investor country has now been updated* *4. The investor country DFP has confirmed that they have no objection to the change of name of the project participant and that their original LoA is still applicable and valid. The email confirmation, dated 26/11/2012, has now been forwarded to the verifying AIE.*		

Finding:	CAR A2
DOE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	1-3: OK. The PP updated the name of the PP according to the DFP-letter. 4: OK. The mail confirms that the Belgian DNA has no objection to the change of name of the project participant and that the original LoA is still valid/MAIL/.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	CAR B1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	Monitoring Report 1. The letter of the French DFP is not mentioned in the MR. 2. The monitoring period shall be divided in subperiods to reflect the actual status of data provision. Annex 2: 3. The monthly calibration data are not complete 4. The name of the 60 % NAP flow meter is not correct 5. The gauze primary change and top up of secondary catalyst are not mentioned in the main plant events table Annex 3: 6. The organisational chart does not reflect the current situation		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	*1. The document provided by the French DFP on the 05-11-2012 is now mentioned in the MR.* *2. The monitoring was divided in sub-period 3.1 and 3.2 and the description of the monitoring period was updated accordingly.* *3. The monthly calibration dates are completed now* *4. The correct supplier, make and model is now mentioned in the MR* *5. The events list was updated and the date of the gauze change and top up of secondary catalyst is now mentioned.* *6. The new organisational chart was introduced to annex 3 of the MR*		

Finding:	CAR B1
DOE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	1. OK. The letter of the French DFP is mentioned in the MR. 2. OK. The PP makes a correct division of the monitoring period in two subperiods. The first subperiod 3.1 is matter of this verification. 3. OK. The monthly calibration dates are now included in the MR 4. OK. The PP revised the info given in the MR 5. OK. The event list has been updated. 6. OK. The PP included the new organisational chart presented by the plant during on-site visit.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	CAR C1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	Excel sheet: 1. The substitution value in times the AMS was out of operation has not been calculated as per methodology. 2. The gauze primary change and top up of secondary catalyst are not mentioned in the plant events table.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	*1. In the period 04.09.2012 10:00 until 04/09/2012 16:00 maintenance work was carried out at the NCSG analyser for this period NCSG values from the second analyser were used. As this approach was not according to the methodology, the calculation sheet was changed in a way to use the substitute value for this period.* *2. The primary gauze change and top up of catalyst is now mentioned for the maintenance period 18/09/2012 – 11/10/2012*		
DOE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	1. OK. A substitute value of 186.53 ppm has been correctly applied. 2. OK. The change of gauze has been mentioned.		

Finding:	CAR C1
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements

Finding:	CAR E2		
Classification	☐ CAR	☐ CL	☒ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	For the remaining period (11/12 and 12/12) following docs shall be provided: 1. Projet domestique event sheet. 2. Monthly report to the government regarding emissions of NOx and N_2O and Nitric Acid output. 3. Raw data set. 4. A1048 XLS-sheet including monthly calibration of AMS.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*			
DOE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*			
Conclusion *Tick the appropriate checkbox*	☒ To be checked during the next periodic verification (subperiod 3.2) ☐ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

5. SUMMARY OF VERIFICATION ASSESSMENTS

The following paragraphs include the summary of the final verification assessments after all CARs and CLs are closed out. For details of the assessments pls. refer to the discussion of the verification findings in chapter 4 and the verification protocol (Annex 1).

5.1. Implementation of the project

The GHG emission reduction project at Borealis PEC-Rhin's nitric acid plant is achieved by catalytic destruction of N_2O. The nitric acid plant started the commercial nitric acid production in 1970.

The N_2O reduction catalyst was installed in both burners and operational since 2010-06-15 and was toped-up during the shutdown on 2011-05-01 to 2011-06-13 and also during regular plant stop on 2012-09-18. The N_2O destruction efficiency increased after.

For the purpose of monitoring the N_2O emissions Borealis PEC-Rhin has installed and operates an Automated Monitoring System according to EU standards (EN14181).

During the verification a site visit was carried out. On the basis of this site visit and the reviewed project documentation it can be confirmed that w.r.t. the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the registered PDD.

5.2. Project history

CAR A1 (FAR A1 of last verification/VR2/)

It must be checked at each verification, that the total amount of verified emission reductions until 2012-12-31 does not exceed the limit of 351,440 tonnes (before 10 % reduction) according to the LoA.

5.3. Special events

Some events have been taken place, which influenced the N_2O-emissions from the plant and as an effect of this, catalyst performance and N_2O release to the atmosphere. The PP provided an overview of the events, which was spot-checked by the verifier.

Date	Main Plant Events
2012-01-04 to 2012-01-05	The plant/PP provided sufficient evidences regarding plant operation but these will not be included in the report due to confidentiality issues.
2012-01-31 9:33 to 17:43	
2012-04-25 15:38 to 23:38	
2012-06-25 to 2012-06-27	
2012-09-18 to 2012-10-11	

Table 5.3.: Special events

5.4. Compliance with the monitoring plan

The monitoring system and all applied QA/QC procedures are completely in compliance to the registered monitoring plan.

The monitoring system and all applied procedures are completely in compliance to the registered monitoring plan/PDD/.

The verifier confirms that the monitoring plan and the applied methodology have been properly implemented and followed by the project participants. All parameters stated in the monitoring plan and the applied methodology have been sufficiently monitored and updated as applicable.

- AST-test of the AMS has successfully been carried out in 2012 on 2012-09-13 to 2012-09-14/AST/
- Span gas bottles uses for regular calibration are in period of validity
- New Nitric Acid flow meters (Supplier: FLEXIM Model: PIOX S) were installed in October 2011, no calibration is necessary, regular crosschecks with mass balance calculation has been carried out

5.5. Monitoring parameters

During the verification all relevant monitoring parameters (as listed in the PDD) have been verified with regard to the appropriateness of the applied measurement / determination method, the correctness of the values applied for ER calculation, the accuracy, and applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist.

It can be confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.

Parameter:	Unit:	Applied value:
$NCSG_n$	mgN_2O/Nm^3	
	301.28	mean

	152.37	lower limit of confidence interval
	455.30	upper limit of confidence interval
VSG_n	[Nm³/h]	
	116,078	mean
	105,907	lower limit of confidence interval
	126,732	upper limit of confidence interval

Table 5.5.1.1: Upper/Lower limit and mean value of NCSG and VSG according to statistical analysis applied for ER-calculation for sub-period 3.1.

Parameter:	Unit:	Applied value:
NCSG	[mg N_2O/Nm³]	301.28
VSG	[Nm³/h]	116,078
OH_n	[h]	7,094
NAP_n	[tHNO_3]	279,456
OT	[°C]	Not applicable
AIFR	[%]	Not applicable
AFR	[Nm³/h]	Not applicable
TSG	[°C]	Not applicable
PSG	[Pa]	Not applicable
EF_n	[kgN_2O/tHNO_3]	According to formula: $EF_n = (PE_n / NAP_n)$, the result is: 0.88775
EF_{BM}	[kgN_2O/tHNO_3]	1.85
EF_{reg}	[kgN_2O/tHNO_3]	7.7 until 2010-12-31 and 3 from 2011-01-01 onwards
PE_n	[kgN_2O]	248,087.48

Table 5.5.2: Monitored plant parameter/input for ER calculation

5.6. Monitoring report

A draft monitoring report was submitted to the verification team by the project participants. The team has made this report publicly available during the verification activities. No comments were received.

During the verification, mistakes and needs for clarification were identified. The PP has carried out the requested corrections so that it can be confirmed that the monitoring report is complete and transparent and in accordance with the registered PDD and other relevant requirements.

5.7. ER Calculation

During the verification, mistakes in the ER calculation was identified (CAR E1). A revised final ER calculation sheet /XLS/ was prepared by the PP and presented to the verification team. Thus it is confirmed that the ER calculation is overall correct. The verifiers confirm that:

- A complete set of data for the specified monitoring period is available, all the data has been provided in the monitoring report /MR/ and the ER calculation spreadsheet /XLS/;
- Information provided in the monitoring report has been cross-checked with original data from the plant operation log and DCS records; all documents illustrate consistency;
- Appropriate emission factors and other reference values have been correctly applied, and assumptions used in emission calculations have been justified;

Thus it is confirmed that the final ER calculation is overall correct.

Parameter	Value	Unit
Nitric Acid Production (100% concentrate)	279,456	$tHNO_3$
Project Emissions	248,087.48	tCO_2e
Emission Factor	0.88775	$kgN_2O/tHNO_3$
Governmental ERU deduction	10	%
Emission Reductions Subperiod 3.1 (after deduction)	75,024	tCO_2e
Emission reductions 1st monitoring period	70,710	tCO_2e
Emission reductions 2nd monitoring period	110,972	tCO_2e
Sum of emission reductions	256,706	tCO2e

LoA-Cap	316,296	ERUs (tCO_2e)
Sum of emissions below cap	Yes	

Table 5.7: Relevant data and outcome of ER-calculation

5.8. Quality Management

The plant conforms to the Management System Standard: "*Fertilizers Europe*, Product Stewardship Standard Issue 3, (2010-08-18)".

It provides Quality Management procedures for measurements, collection and compilation of data, data storage and archiving, calibration, maintenance and training of personnel in the framework of this JI project activity have been defined. The procedures defined can be assessed as appropriate for the purpose. No significant deviations thereof have been observed during the verification.

5.9. Overall Aspects of the Verification

All necessary and requested documentation was provided by the project participants so that a complete verification of all relevant issues could be carried out.

Access was granted to all installations of the plant which are relevant for the project performance and the monitoring activities.

No issues have been identified indicating that the implementation of the project activity and the steps to claim emission reductions are not compliant with the UNFCCC / host country criteria and relevant guidance provided by the COP/CMP and the JISC (clarifications and/or guidance).

5.10. Hints for next periodic Verification

None since this is the final verification

6. VERIFICATION OPINION

Borealis PEC-Rhin SAS. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 3rd periodic verification of the project: "Borealis PEC Rhin N_2O Abatement Project", with regard to the relevant requirements for JI (Track 1) project activities. The project reduces GHG emissions due to reduction of N_2O emissions. This verification covers the subperiod 3.1 from 2012-01-01 to 2012-11-18 (including both days).

In the course of the verification 5 Corrective Action Requests (CAR) and 0 Clarification Request (CL) were raised and successfully closed. The verification is based on the draft monitoring report, revised monitoring report, and the monitoring plan as set out in the registered PDD, the determination report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

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

- all operations of the project are implemented and installed as planned and described in the project design document.
- the monitoring plan is in accordance with the applied country specific methodology: Méthode pour les Projets Domestiques: "Réduction catalytique du N_2O dans des usines d'acide nitrique".
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 3rd.1 periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions: **75,024** t CO_2e in subperiod 3.1

Including a deduction to 10% according to the Arrêté du 2 mars 2007.

Essen, 2012-12-07

Ulrich Walter

TÜV NORD JI/CDM CP

Verification Team Leader

Essen, 2012-12-07

Rainer Winter

TÜV NORD JI/CDM CP

Final Approval

7. REFERENCES

Table 7-1: Documents provided by the project participant(s)

Reference	Document
/**AMS**/	Certificat de conformite, (Declaration of conformation) issued by Thermo electron cooperation regarding the Nicolet 6700 analyser, dated 2010-06-04
/**AN-MAINT**/	Contract with ThermoFisher Scientific for maintenance of the analyser Nicolet 2011-02-17
/**AST**/	• Annual Surveillance Test AST (carried out by Müller-BBM on 27-28/09/2011); report no. M95 188/1, dated 14/10/2011. • Annual Surveillance Test AST (carried out by Müller-BBM on 2012-09-13 to 2012-09-14); report no. M102329/1, dated 2012-11-16.
/**AP**/	Arrete Prefectoral No.: 2008-226-14, issued by the Prefecture de Gironde on 2008-08-13 regarding max. Emission from Nitric Acid plant
/**BP**/	Référentiel de bonnes pratiques: Protocole de quantificationdes émissions de protoxide d'azote dans la fabrication d'acide nitrique (Best practice document regarding the mass-balance calculation and emission calculation in nitric acid plants
/**CALAMS**/	A 1048 Analyse IRTF destruction catalytique mesure de N_2O AMS-calibration: XLS-sheet with calibration dates, events and results of calibration
/**CALGAS**/	Calibration gas certificates for the AMS, all in period of validity
/**CDMA**/	Contrat de maintenance (Maintenance-contract for the AMS-Analysator Nicolet 6700 between Thermo Fisher Scientific and PecRhin, dated 2011-02-17
/**CERT**/	Management System Certificate to certify conformity with the Fertilizers Europe Product Stewardship Standard Issue 3 (2010-08-18), issued by DNV on 2011-05-24 valid until 2013-05-24.
/**CONMAIL**/	Mail of the French DFP, (Autorité Nationale Désignée pour les Projets de Développement Propre du Protocole de Kyoto Point Focal Désigné pour les Projets de Mise en Oeuvre Conjointe), dated 2012-11-29, confirming the approach of dividing the monitoring period in two separate subperiods with only one on-site visit.

Reference	Document
/**CONS**/	Tableau de consolidation des Donnes (EXCEL-sheet used for daily data consolidation and check of plausibility of AMS results)
/**DECLA**/	Auto-controle des rejets dans l'eau et dans l'air (3 monthly declaration of plant emissions to the local government, including monthly reports of daily average NOx and N_2O emissions and monthly Nitric Acid output, covering January to October 2012.
/**FICHE**/	Fiche renseignement carte de contrôle NAP –Check of max. Deviation between NAP-flowmeter and mass balance
/**LOA**/	Host country : • LoA issued by the French "Ministère de l'Écologie, de l'Énergie, du Développement Durable et de la Mer, en charge des Technologies vertes et des Négociations sur le climat" on 2010-12-30, Ref-No. : 1D10022284 • Letter, issued by the French "Ministère de l'Écologie, de Dévelopement Durable et de l'Énergie on 2012-11-05, Ref-No. : 12-080 5^E CB : o involving Borealis PEC-Rhin SAS instead of PecRhin S.A. as project participant and o renaming the project from ▪ "Pec Rhin N_2O abatement project" to ▪ "Borealis Pec Rhin N_2O abatement project" (these are the English translations). Investor country: • LoA issued by the Belgian « National Climate Commission » on 2011-04-04, Ref-No.: NKC/FP/7
/**MR**/	• Published Monitoring report of GHGs emission reductions (Track1) (01.01.2011 – 31.12.2011) "BOREALIS PEC RHIN N_2O abatement project" dated 2012-11-01 issued by N.serve (version 1). • Final Monitoring report of GHGs emission reductions (Track1) (01.01.2011 – 31.12.2011) "BOREALIS PEC RHIN N_2O abatement project" dated 2012-12-05 issued by N.serve (version 3).
/**MAIL**/	On 2012-11-26, the Belgian DFP (Departement Leefmilieu, Natuur en Energie Afdeling Lucht, Hinder, Risicobeheer, Milieu & Gezondheid) confirms that the Belgian DNA has no objection to the change of name of the project participant and that the original LoA is still valid.
/**NAP PAR**/	• Parameter set protocol for Krohne NAP flow meter FT 1021 for 69 % HNO_3 and FT 1022 for 60 % HNO_3 flow.

Reference	Document
	• Configuration Parameter for Flexim concentration and flow meter AI1028 and FI 1028 for 60 % HNO_3 and AI1029 FI1029 for 69HNO3 flow
/**ORG**/	Organisation "protection de l´air" (also "projets domestiques"). Survey of personnel organisation of the JI-project, issued by the BOREALIS PEC RHIN plant.
/**P&I**/	Pipe and Installation sheet of Nitric Acid Plant.
/**PROC**/	Procedures generals, organisation générale de la société Borealis PEC-Rhin (General procedure of management of the Borealis PEC-Rhin plant, rev. 3, dated 2012-06-04.
/**PROC1**/	Overview on events relevant for the monitoring.
/**PROC2**/	Procedure – Mode operatoire de verification d'une mesure de pression de niveau ou debit a pression differentielle, No.: 15.400-03-14, (Procedure – procedure of verification of measuring pressure level or flow differential pressure)
/**PROC3**/	Procedure – Manuel maintenance travaux 33evus, No.: 15.405.00, (Procedure Manual – new maintenance work)
/**PROC4**/	Procedure – Consignes d'exploration et projet domestique, (Procedure – Instructions for exploration and domestic project)
/**PROC5**/	Procedure – Manual Maintenance Travaux Neufs: Procedures Techniques MTN, (Maintenance procedures for analyser, VSG, PSG, TSG, AFR, AIFR, OT)
/**PROC6**/	Procedure – Procedures techniques MTN (Technical procedures for monitoring of relevant parameter of the abatement project Parameter list (Calcul debit rejets HNO3 FI 1012; printouts from FBD program graphics, stack diameter) Parameter implementation in the DSC.
/**PROC7**/	Procedure – Organisation de la Cellule Analysateur pour le Suivi de analysateur securite (IPS) environment qualite (Organisation of maintenance of the AMS), TEIN/12/300
/**QAL2CAL**/	• QAL2 Report on performance tests and calibration of the AMS, report No.: M87 043/2, issued by Müller BBM on 2010-11-12. • Revised version: Report on performance tests and calibration of the AMS, report No.: M87 043/2, issued by Müller BBM on 2011-07-05.

Reference	Document
/**QAL2INST**/	QAL2 check of correct installation of the AMS, report No.: M87 043/2, issued by Müller-BBM on 2010-11-12.
/**QAL2PERF**/	Report on performance tests of the AMS for N_2O of acid plant for internal use, report No.: M87 043/1, issued by Müller BBM on 2010-05-19.
/**REG**/	Immatriculation Principale au Registre du Commerce et des Societes (Extract from commercial register to identify Borealis PEC-Rhin as correct name of the PP. Of the plant, dated 2012-06-26.
/**CAT**/	Contrat de Catalyst supply agreement (contract between BOREALIS PEC RHIN and JM regarding catalyst supply, dated 2010).
/**TRAINAMS**/	Attestation de presence: Service training for measuring and maintains of the analyser Nicolet 6700: Jean BIGI and Benjamin CHAPUS, dated 2010-06-04.
/**THERMO**/	Rapport d'intervention: 47076 (Report of annual maintenance of the AMS carried out by Thermo Scientific, supplier of the AMS, dated 2012-09-04). Outcome: The equipment is suitable for operation
/**VR2**/	JI Verification Report, - 2nd period, Pec Rhin S.A., "Pec Rhin N_2O Abatement Project", Monitoring Period: 2011-02-16 to 2011-12-31, Report No: 8000404560 12/049, Date: 2012-03-23
/**XLS**/	• Initial EXCEL-sheet: CALC_N03_V01_PecRhin_20121114 • Final EXCEL-sheet: CALC_N03_V02_PecRhin_20121120

Table 7-2: Background investigation and assessment documents

Reference	Document
/**14181**/	European Standard DIN EN 14181: "Stationary source emissions – Quality assurance of automated measuring systems"
/**AM0034**/	Approved baseline and monitoring methodology AM0034: "Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants", version 3.4
/**AR**/	Arrêté du 2 mars 2007 of the 'Ministère de l'écologie et du développement durable (Implementation of the JI-Guidelines in France)
/**BACK**/	Background paper: "N_2O EMISSIONS FROM ADIPIC ACID AND NITRIC ACID PRODUCTION", Good Practice Guidance and Uncertainty

Reference	Document
	Management in National Greenhouse Gas Inventories issued by the NGGIP
/**BREF**/	Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilisers
/**CPM**/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/**DET**/	Final JI Determination Report: "Pec Rhin S.A., Pec Rhin N_2O abatement project, Report No: 8000382322 – 10/147, dated: 2011-03-03, issued by TÜV Nord
/**DVM**/	JI Determination and Verification Manual
/**GUIDE**/	Guidance: Developing a CDM or JI project to reduce greenhouse gas emissions, issued by the: • French Ministry for Economy, Industry and Employment • French Ministry for Ecology, Energy, Sustainable Development and Town and Country Planning • French Global Environment Facility
/**IPCC**/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/**KP**/	Kyoto Protocol (1997)
/**MA**/	Decision 3/CMP. 1 (Marrakesh – Accords)
/**METH**/	Méthode pour les Projets Domestiques Réduction catalytique du N_2O dans des usines d'acide nitrique (Projet Domestique Methodology: Catalytic reduction of N_2O at nitric acid plants)
/**METHE**/	Projet Domestique Methodology Catalytic reduction of N_2O at nitric acid plants (Translation of /METH/)
/**NCSG**/	Diagram of parameter NCSG - Extract of ERU-calculation Excel-sheet
/**OT**/	Frame of parameter OT - Extract of ERU-calculation Excel-sheet
/**PDD**/	"Project Design Document Version 02 dated 2010-05-04 "Pec Rhin N_2O abatement project" (registered version)

Reference	Document
/**PRESS**/	Standardnormwerte 1961-1990: Luftdruck auf Stationshöhe (Standardised atmospheric-pressure values from years 1961 and 1990), issued by the Swiss Confederation, Federal office of Meteorology and Climatology MeteoSwiss • Station Basel: Maximum registered atmospheric pressure is 981,4 hPa

Table 7-3: Websites used

Reference	Link	Organisation
/**bref**/	http://eippcb.jrc.ec.europa.eu/reference/	Website of the European Commission, Joint Research Centre, Institute for Prospective Technological Studies (Provision of BAT-Reference documents)
/**dehst**/	http://www.dehst.de	German Emissions Trading Authority (DEHSt) at the Federal Environment Agency
/**dfp**/	http://www.developpement-durable.gouv.fr/	Ministère de l'Écologie, de l'Énergie, du Développement Durable et de la Mer, en charge des Technologies vertes et des Négociations sur le climat
/**douane**/	http://www.douane.gouv.fr/data/file/6146.pdf	Web-file regarding N_2O emission taxation.
/**gw**/	http://www.global-warming.de/	TÜV Nord platform hosting projects open for comments at the determination stage
/**ipcc**/	www.ipcc-nggip.iges.or.jp	IPCC publications
/**lf**/	http://www.legifrance.gouv.fr/	Site of Legifrance (La service public de la diffusion du droit)
/**mist**/	http://www.ecologie.gouv.fr/Methodologies-de-projets.html	Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer (Ministry of ecology and sustainable development)
/**nfg**/	http://www.effet-de-serre.gouv.fr/accueil	Mission interministérielle sur l'effet de serre (French Inter-Ministry Mission on the Greenhouse Effect)

Reference	Link	Organisation
/**unfccc**/	http://ji.unfccc.int	JI homepage
/**proj**/	http://ji.unfccc.int/JIITLProject/DB/PK2RRNV3FP1DC3D5UK4CYF3XOSIGJR/details	Project listed in JI-database

Table 7-4: List of interviewed persons

Reference	MoI[1]		Name	Organisation / Function
/**IM01**/	V	☒ Mr. ☐ Ms	Jean Marc Bastian	PecRhin Nitric Acid Plant Production Manager
/**IM01**/	V	☒ Mr. ☐ Ms	Silvere Arnault	PecRhin Nitric Acid Plant HSE Engineer
/**IM01**/	V	☒ Mr. ☐ Ms	Vincent Simet	PecRhin Nitric Acid Plant Production Engineer
/**IM01**/	V	☒ Mr. ☐ Ms	Jean-Pierre Enond	PecRhin Nitric Acid Plant Laboratory Supervisor
/**IM01**/	V	☒ Mr. ☐ Ms	Cystelle Roussel	PecRhin Nitric Acid Plant Technican Maintenance
/**IM01**/	V	☒ Mr. ☐ Ms	Jean Bigi	PecRhin Nitric Acid Plant Technican Monitoring
/**IM01**/	V	☒ Mr. ☐ Ms	Ayi Gabiam	PecRhin Nitric Acid Plant Technican PCS
/**IM02**/	V	☒ Mr. ☐ Ms.	Martin Stilkenbäumer	N.serve Head of Project Management

[1)] Means of Interview: (**T**elephone, **E**-Mail, **V**isit)

ANNEX

A1: Verification Protocol

ANNEX 1: VERIFICATION PROTOCOL

Table A-1: GHG calculation procedures and management control testing / detailed audit testing of residual risk areas and random testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)
Raw data generation				
• Installation of measuring equipment • Dysfunction of installed equipment • Maloperation by operational personnel • Downtimes of equipment • Exchange of equipment • Change of measurement equipment characteristic • Insufficient accuracy • Change of	• Installation of modern and state of the art equipment • Process control automation • Internal data review • Regular visual inspect-ions of installed equip-ment • Only skilled and trained personnel operates the relevant equipment • Daily raw data checks • Immediate exchange of dysfunctional equipment	• Inadequate installation / operation of the monitoring equipment • Inadequate exchange of equipment • Change of personnel • Undetected measurement errors • Inappropriateness of Management system procedures w.r.t. monitoring plan requirements (e.g. substitute value strategies) • Non-application of management system procedures	• Site – visit (maintenance dept., gas supplier) • Check of equipment • Check of technical data sheets • Check of suppliers information / guarantees • Check of calibration records, if applicable • Check of maintenance records • Counter-check of raw data and commercial data • Check of JI manage-ment system	• **See Table A-2**

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)
technology • Accuracy of values supplied by Third Parties	• Stand-by duty is organized • Training • Internal audit procedures • Internal check of QA/QC measures of involved Third Parties	• Insufficient accuracy • Inappropriate QA/QC measures of Third Parties	• Check of JI related procedures • Application of JI management system procedures • Check of trainings • Check of responsibilities • Check of QA/QC documentation / evidences of involved Third Parties	
Raw data collection and data aggregation				
• Wrong data transfer from raw data to daily and monthly aggregated reporting forms • IT Systems • Spread sheet programming • Manual data transmission	• Cross-check of data • Plausibility checks of various parameters. • Appropriate archiving system • Clear allocation of responsibilities • Application of JI Management system procedures	• Unintended usage of old data that has been revised • Incomplete documentation • Ex-post corrections of records • Ambiguous sources of information • Non-application of management system procedures	• Check of data aggregation steps • Counter-calculation • Data integrity checks by means of graphical data analysis and calculation of specific performance figures • Check of management system certification	• **See Table A-2**

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)
• Data protection • Responsibilities	• Usage of standard software solutions (Spreadsheets) • Limited access to IT systems • Data protection procedures	• Manual data transfer mistakes • Unintended change of spread sheet programming or data base entries • Problems caused by updating/upgrading or change of applied software	• Check of data archiving system • Check of application of Management system procedures	
Other calculation parameters				
• Emission factors, oxidation factors, coefficients	• The values and data sources applied are defined in the PDD and monitoring plan	• Unintended or intended Modification of calculation parameters • Wrong application of values • Misinterpretations of the applied methodology and/ or the PDD • Missing update of applicable regulatory framework (e.g. IPCC values)	• Update-check of regulatory framework • Countercheck of the applied MP in the MR against the approved version	• **See Table A-2**
Calculation Methods				

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)
• Applied formulae • Miscalculation • Mistakes in spread-sheet calculation	• Advanced calculation and reporting tools • A JI coordinator is in charge of the JI related calculations • Usage of tested / counterchecked Excel spreadsheets • Involvement of external consultants	• The danger of miscal-culation can only be minimized.	• Countercheck on the basis of own calculation. • Spread sheet walk-trough. • Plausibility checks • Check of plots	• **See Table A-2**
Monitoring reporting				
• Data transfer to the author of the monitoring report • Data transfer to the monitoring report • Unintended use of outdated versions	• An experienced JI consultant is responsible for monitoring reporting. • JI QMS procedures are defined	• The danger of data transfer mistakes can only be minimized • Inappropriate application of QMS procedures	• Counter check with evidences provided. • Audit of procedure application	• **See Table A-2**

Table A-2: (Project specific) Periodic Verification Checklist

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
A	***Project Approvals by Parties involved***					
A.1	*DVM § 90* Has the DFPs of at least one Party involved, other than the host Party, issued a written project approval when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines, at the latest?	*Description:* The PP provided –additionally to the revised host country LoA- an LoA issued by the National Climate Commission of Belgium. The LoA is issued to Pec Rhin S.A.. *Means of determination:* DFP-website, LoA, MR, commercial register *Conclusion:* Due to a change of shareholders the plant name was changed from Pec Rhin S.A. to Borealis PEC-Rhin SAS. This has been communicated to the French DFP, but since the DFP issued a letter stating a new project name and involved Borealis PEC-Rhin SAS instead of PecRhin S.A. as project participant, communication to the Belgium DFP (Investor) is still necessary. <u>CAR A2:</u> The name of the plant has been changed. 1. As stated in the revised French LoA issued on 2012-11-05 the name of the project in the project documentation has not been changed accordingly.	/LOA/ /dfp/ /proj/ /GUIDE/ /REG/	CAR A2	~~CAR A2~~	OK

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No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		Table 2.1: 2. The name of the plant as project participant of the host country has not been updated. 3. The name of the plant as project participant of the investor country has not been updated. 4. No evidences with the investor country regarding the change of the name of the project participant have been provided so far.				
A.2	*DVM § 91* Are all the written project approvals by Parties involved unconditional?	*Description:* The French LoA has two conditions, which need to be taken into account: • Only 90 % of the verified emission reductions of one period shall be claimed by the PP. The ERU quantity stated in this report already takes into account the 10% deduction. • The total amount of verified emission reductions until 2012-12-31 is limited to 351,440 tonnes (before 10 % reduction) The Belgian LoA is unconditional *Means of determination:* LoA *Conclusion:* OK, • 10 % of the emission reductions are subtracted from the initial result. The ERU quantity stated in this report	/LOA/ /dfp/ /unfccc/ /MR/	CAR A1	~~CAR A1~~ Pls. see Chapter 4	OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		already takes into account the 10% deduction. • The verifier concludes that the sum of emission reduction does not exceed the maximum amount. CAR A1 was raised to compare the verified amount of ERUs with the limit defined in the LoA.				
B	***Project implementation***					
B.1	*DVM § 92* Has the project been imple-mented in accordance with the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website?	*Description:* The N_2O reduction catalyst was installed in both burners and operational since 15/06/2010 and was toped-up during the shutdown on 01/05-13/06/2011 and on 2012-09-18. The N_2O destruction efficiency increased after. For the purpose of monitoring the N_2O emissions Borealis PEC Rhin has installed and operates an Automated Monitoring System according to EU standards (EN14181). QA/QC measures were implemented. *Means of determination:* PDD, certificates and 3rd party reports provided by the PP, inspections during on-site visit *Conclusion:* The project installations (Abatement catalyst, AMS) and procedures were checked by the verification team and compared with the description given in the registered PDD. The installation of the abatement catalyst and monitoring system is in line with the PDD.	/PDD/ /DET/ /MR/ /PROC1 - PROC7/ /QAL2CAL/ /QAL2INST/ /QAL2PERF/ /P&I/ /ORG/			OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
			/14181/			
B.2	*DVM § 93* What is the status of operation of the project during the monitoring period?	*Description:* The project is running according to the description provided in the PDD. Some unexpected situations appeared which are business as usual failures and correctly noted in the report. *Means of determination:* Calculation sheets annexed to the monitoring report, on-site visit and inspection of implementations, plant history, PDD *Conclusion:* The project history was discussed in detail during on site visit and found to be reasonable. During the on-site visit it was evidenced that the abatement system and AMS were in place and running for the entire period. The status of the project has been included in the MR. Minor mistakes were found and following CAR has been raised: <u>CAR B1:</u> Monitoring Report 1. The revised LoA is not mentioned in the MR. 2. The monitoring period shall be divided in subperiods to reflect the actual status of data provision. Annex 2: 3. The monthly calibration data are not complete 4. The name of the 60 % NAP flow meter is not correct 5. The gauze primary change and top up of secondary	/PDD/ /XLS/ /MR/ /PROC1/ /NCSG/ /OT/	CAR B1	~~CAR B1~~ Please see chapter 4	OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		catalyst are not mentioned in the main plant events table Annex 3: 6. The organisational chart does not reflect the current situation				
C	***Compliance with monitoring plan***					
C.1	*DVM § 94* Did the monitoring occur in accordance with the monitoring plan included in the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website?	*Description:* Monitored parameters and parameters (according to the methodology and the registered PDD) used for calculation are: • $NCSG_n$ [mg N_2O/Nm^3] *Meaning:* Average N_2O concentration in the tail gas during project Verification Period n. *Source:* Continuous emissions N_2O analyser (AMS) *Measurement frequency:* Hourly value based on continuous monitoring (10 second frequency) • VSG_n [Nm^3/h] *Meaning:*	/PDD/ /MR/ /14181/ /XLS/ /CERT/ /NAP1/ /NAP2/ /CALAMS/ /CALGAS/ /14181/ /CDMA/			OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		Average Normal-Volume flow rate of the tail gas during project Verification Period n. Normalisation calculation takes place in the plant DCS and used Temperature and pressure values derived by the plant monitoring equipment (see below). *Source:* Gas volume flow meter (part of plant DCS) *Measurement frequency:* Hourly value based on continuous monitoring (10 second frequency) • PE_n [kgN_2O] *Meaning:* N_2O emissions during project Verification Period n. *Source:* Calculated from measured data *Measurement frequency:* Calculated after each Verification Period *Applied value:* Calculated according to the formula of the methodology:	/NCSG/ /OT/ /DECLA/			

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		PEn = VSG_n *$NCSG_n$ * OH_n • OH_n [hours] *Meaning:* Total operating hours of Verification Period n. *Source:* Production Log – taking into account the relevant trip point parameters Temperature [OT] and ammonia to air ratio. Every production hour which falls in the range of the OT-/ and AIFR-range will be counted. *Measurement frequency:* Continuous based on measurements taken every 30 s. • NAP_n [$tHNO_3$] *Meaning:* Metric tonnes of 100% concentrated nitric acid during any Verification Period n. *Source:* • Electromagnetic nitric acid flow meters and concentration measurement devices on each product stream 60% and 69% used during beginning of				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		verification period) • Ultrasonic flow meter installed on 60% production line, measuring volume flow, concentration and temperature. (used from 2011-03-18) • Ultrasonic flow meter installed on 69% production line, measuring volume flow, concentration and temperature. (used from 2011-10-19) *Measurement frequency:* Continuous based on measurements taken every 30 s. • OT [℃] *Meaning:* Oxidation temperature in the ammonia oxidation reactor (AOR). Median value is used for trip observation *Source:* 3 thermocouples inside the east of both burners of the plant. *Measurement frequency:* Hourly median value based on continuous monitoring; measurements taken every 30 s. • AFR [$kgNH_3/h$]				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		Meaning: Ammonia Flow rate to the ammonia oxidation reactor (AOR) *Source:* Ammonia flow measurements *Measurement frequency:* Hourly average value based on continuous monitoring; measurements taken every 30 s. • AIFR [%] *Meaning:* Ammonia to air ratio into the AOR *Source:* Ammonia & Air flow meters *Measurement frequency:* Hourly average value based on continuous monitoring; measurements taken every 30 s. • TSG [°C] *Meaning:*				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		Temperature of tail gas (for normalising of VSG) *Source:* Thermocouple (part of the measuring and control system of the plant). *Measurement frequency:* Hourly average value based on continuous monitoring; measurements taken every 10 s. • PSG [Pa] *Meaning:* Pressure of tail gas (necessary for normalising of VSG) *Source:* Probe of the plant DCS, measurement of pressure gradient between stack and atmosphere adding a default value of 1013 hPa for generating an absolute value. *Measurement frequency:* Hourly average value based on continuous monitoring; measurements taken every 10 s. • EF_n [$kgN_2O/tHNO_3$] *Meaning:*				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		Emissions factor calculated for project Verification Period n. *Source:* Calculated from measured data • EF_{reg} [$kgN_2O/tHNO_3$] *Meaning:* Emissions cap for N_2O from nitric acid production set by government/local regulation. *Source:* National or local N_2O emissions legislation *(PecRhin 'arrêté préféctoral')* If this regulatory limit is lower than the applicable benchmark emissions factor, then EF_{reg} shall replace EF_{BM} in the calculation of ERUs. • EF_{BM} [$kgN_2O/tHNO_3$] *Meaning:* Specific reference value (benchmark emissions factor) that will be applied to calculate the emissions reductions from a specific Verification Period.				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		Source: Included in the French Methodology QA/QC: The PP refers to the project European standard 14181 regarding implementation of monitoring equipment and maintenance procedures and to the European Fertilizers standard for QA/QC. *Means of determination:* PDD, Monitoring report, ERU-calculation, server data, emission declaration to local government, DIN EN 14181, methodology, quality related procedures provided by the plant staff, on-site inspections and interviews with involved staff. *Conclusion*: The verification team confirms that the monitoring of the relevant parameter implemented in the project and the referenced standards are in accordance with the monitoring plan of the final PDD. Checked details are i.e.: • Measurement frequency • Data source • Measurement procedures • Quality procedures • Measuring points				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		• Cross checks • Data handling, storage and processing				
C.2	*DVM § 95a)* For calculating the emission reductions or enhancements of net removals, were key factors, e.g. those listed in 23 (b) (i)-(vii) above, influencing the baseline emissions or net removals and the activity level of the project and the emissions or removals as well as risks associated with the project taken into account, as appropriate?	*Description:* The project baseline is set by default values in the methodology EF_{BM} which was issued by the French DFP. Default values are expressed in benchmark values: Year: 2009 2010 2011 2012 Value EF_{BM}: 2.5 2.5 2.5 1.85 [kg N_2O/t HNO_3] These benchmark values are the key factors, which influence the baseline scenario and reduce the accountable emission reductions from realistic baseline emissions to the above mentioned values. The results of risk assessment are extensive measures to prevent a bypass of process gases in the catalyst bed since this will lead to a reduction of catalyst efficiency. Decreasing catalyst efficiency was identified as most important project risk *Means of determination:* French methodology, LoA, interviews Borealis PEC Rhin plant staff *Conclusion:* The benchmark values are correctly considered in the calculation of baseline emissions and take into account the sectoral reform policies and legislation (point 23	/METH/ /LOA/ /AP/			OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		(b) (i) of DVM). The verification team can confirm, that the result of risk assessment (risks associated with the project) was taken into account.				
C.3	*DVM § 95b)* Are data sources used for calculating emission reductions or enhancements of net removals clearly identified, reliable and transparent?	*Description:* Parameter and related data sources are: • $NCSG_n$ [mg N_2O/Nm^3] Thermo Scientific Nicolet 6700, Tag No: AI1048-4 • VSG_n [Nm^3/h] VSG measurement by Endress + Hauser Deltabar flow meter, Tag No: FI1012 • PE_n [kgN_2O] Calculation from measured data • OH_n [h] Production Log – taking into account the trip point parameter OT (Temperature in the oxidation reactor east) • NAP_n [$tHNO_3$] Ultrasonic flow meter FLEXIM 'PIOX' AFR	/PDD/ /MR/ /P&I/			OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		60 % HNO_3: Tag-No. FI1028, AI1028 69 % HNO_3: Tag-No. FI1029, AI1029 • OT [°C] Endress + Hauser Thermal element PT100 • Ammonia flow meter Endress and Hauser Deltabar [kg NH_3/h] • AIFR [%] Ammonia and Air flow meters • TSG [°C] TSG measurement by Endress + Hauser Thermal element PT100 • PSG [Pa] Endress + Hauser Cerabar S pressure sensor measuring pressure gradient between stack and atmosphere				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		• EF_n [$kgN_2O/tHNO_3$] For the verification period n the emission factor is: $EF_n = (PE_n / NAP_n)$ • EF_{reg} [$kgN_2O/tHNO_3$] The max. N_2O-emissions are set by the local government as: 7.7 kg $N_2O/tHNO_3$ until 2010-12-31 and 3.0 kg $N_2O/tHNO_3$ from 2011-01-01 onwards • EF_{BM} [$kgN_2O/tHNO_3$] 1.85 kg in this monitoring period of 2012 The ERU-calculation was carried out according to the formula described in the methodology: $ERU = ((EF_{BM} - EF_n)/1000 \times NAP \times GWP_{N2O}) * 0.9$ (tCO_2e) *Means of determination:* PDD, methodology, plant permits, monitoring report, on-site visit of plant, PCS and data server *Conclusion:* The PP could clearly demonstrate that data sources are clearly identified, reliable and transparent according to implemented procedures.				
C.4	*DVM § 95c)*	*Description:* As described under C.2., the French DFP sets	/PDD/			OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
	Are emission factors, including default emission factors, if used for calculating the emission reductions or enhancements of net removals, selected by carefully balancing accuracy and reasonableness, and appropriately justified of the choice?	emission factors [kg N_2O/t HNO_3] as benchmark values. ERUs cannot be claimed if plant emissions are exceeding this value or if N_2O-emissions are below, ERUs shall be calculated against this value. *Means of determination:* Methodology, Monitoring report *Conclusion:* The benchmark value of 1.85 kg N_2O/t HNO_3 which is applicable for 2012 as set by the French DFP was applied in the ERU correctly calculation. Remark: A Borealis PEC Rhin plant-specific 'arrêté préféctoral' issued by the DRIRE on 13th August limits N_2O emissions plant to 7.7 kg N_2O/tHNO_3 from 2008-08-13 until 2010-12-31 and 3.0 kg N_2O/tHNO_3 from 2011-01-01 onwards. These limits exceed the EF_{BM} and were not taken into account.	/METH/ /MR/ /XLS/ /AP/ /meth/			
C.5	*DVM § 95d)* Is the calculation of emission reductions or enhancements of net removals calculated based on conservative assumptions and the most plausible scenarios in a transparent	*Description:* The calculation includes: • A deduction in baseline emission scenario from 5.41 1.85 kg N_2O/t HNO_3 (benchmark values). • A 10% reduction of the verified emission reductions *Means of determination:* Methodology, PDD *Conclusion:* The implementation of the benchmark values	/PDD/ /METH/ /MR/ /XLS/			OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
	manner?	and 10% reduction is a conservative approach.				
	Applicable to JI SSC projects only					
C.6	*DVM § 96* Is the relevant threshold to be classified as JI SSC project not exceeded during the monitoring period on an annual average basis? If the threshold is exceeded, is the maximum emission reduction level estimated in the PDD for the JI SSC project or the bundle for the monitoring period determined?	*Description:* Estimation of total emissions reductions over the crediting period (after the 10% deduction) of 2 years and 4 month are: 316,296 (tonnes of CO_2e) according to the PDD. *Means of determination:* PDD *Conclusion:* The average ERUs per year obviously exceed the threshold value of 60,000 t CO_{2e} per year; the project is classified as large-scale project.	/PDD/			OK
	Applicable to bundled JI SSC projects only					
C.7	*DVM § 97a)* Has the composition of the bundle not changed from that is stated in F-JI-SSCBUNDLE?	*Description:* N/A *Means of determination:* N/A *Conclusion: N/A*				
C.8	*DVM § 97b)* If the determination was	*Description:* N/A *Means of determination:* N/A				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
	conducted on the basis of an overall monitoring plan, have the project participants submitted a common monitoring report?	*Conclusion: N/A*				
C.9	*DVM § 98* If the monitoring is based on a monitoring plan that provides for overlapping monitoring periods, Are the monitoring periods per component of the project clearly specified in the monitoring report? Do the monitoring periods not overlap with those for which verifications were already deemed final in the past?	*Description:* N/A *Means of determination:* N/A *Conclusion: N/A*				
D	***Revision of monitoring plan***					
	Applicable only if monitoring plan is revised by project participants					
D.1	*DVM § 99a)* Did the project participants provide an appropriate	*Description:* N/A *Means of determination:* N/A *Conclusion: N/A*				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
	justification for the proposed revision?					
D.2	*DVM § 99b)* Does the proposed revision improve the accuracy and/or applicability of information collected compared to the original monitoring plan without changing conformity with the relevant rules and regulations for the establishment of monitoring plans?	*Description:* N/A *Means of determination:* N/A *Conclusion: N/A*				
E	***Data management***					
E.1	*DVM § 101a)* Is the implementation of data collection procedures in accordance with the monitoring plan, including the quality control and quality assurance procedures?	*Description:* Data collection procedures, quality control and quality assurance are implemented as follows: • Measured values were generated by local measurement and monitoring devices, stored in plant's existing data collection and storage system. • Normalisation of stack gas volume flow VSG is carried out in the plant DCS • Default i.e. plant trip point-values were determinated before start of the project and included in the PDD.	/PDD/ /METH/ /MR/ /QAL2INST/ /AST/ /CONS/	CAR C1	~~CAR C1~~ Please see chapter 4	OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		• During data processing, measured values were evaluated according to statistical methods • Application of instrument correction factors: The PP chooses a monitoring standard that requires the establishment of a calibration curve (EN14181). The correction factors derived from this calibration curve during the QAL2 audit must be applied onto both VSG and NCSG calculations. Correction factors are: o 0.98 for stack gas flow meter VSG o 1.04 for measurement of NCSG • Plausibility check: The meth requires a plausibility check of all recorded/monitored data before processing which was conducted by the PP. Plausibility criteria is: Negative values shall be eliminated. • Downtimes of the AMS: Acc. to the methodology, downtimes of the AMS are handled as following: The hourly average is calculated based on the remaining values for the rest of the hour in question. If these remaining values account for less than 50% of the hourly data for one or more parameters, then				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		this hour is eliminated from the calculation and a substitute value is used instead. • Missing data/Substitute value In the case where it is impossible to obtain one hour of valid data for one or more elements of the emissions calculation due to downtime or malfunction of the AMS a substitute value for each hour of missing data is calculated as follows: $C^*subst = C + \sigma_C$ where: C: arithmetic average of the concentration of the relevant parameter σ_C: best estimate standard deviation of the concentration of the relevant parameter. • Permitted overall uncertainty: The methodology requires that the permitted overall uncertainty of the average hourly annual emissions must be less than 7.5% if technically possible. The determinated (combined) uncertainty for N_2O mass flow measurement as per QAL2 report is 4.43% which is below the permitted overall uncertainty.				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		Means of determination: Methodology, Monitoring report, on-site visit of plant, control room with PCS, Equipment hoot for analyser and server room, QAL2 report, data consolidation sheets of project folder *Conclusion:* All procedures related to fulfil the requirements of • quality management of the plant • quality assurance standard of the AMS • data processing as required per methodology were implemented. It has been confirmed that the data collection procedures are as per the description in the determined monitoring plan. Nevertheless finding CAR C1 was raised: <u>CAR C1:</u> Excel sheet: 1. The substitution value in times the AMS was out of operation has not been calculated as per methodology. 2. The gauze primary change and top up of secondary catalyst are not mentioned in the plant events table.				

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion

E.2	*DVM § 101b)*
	Is the function of the monitoring equipment, including its calibration status, is in order?
		Description: The AMS maintenance is included in the quality procedures which are established for proper operation of the plant. The plant operator conducted the AMS supplier Thermo Fisher Scientific for annual maintenance work on the AMS. The PP therefore provides sufficient information regarding contractual/responsibility issues and scope of work.
		Additional measures are related to the European Norm EN14181 (2004) "Stationary source emissions - Quality assurance of automated measuring systems". Müller BBM was conducted to carry out these measures.
		• *Three quality assurance levels of EN 14181:*
		  • QAL 1: ongoing operation and maintenance
		  Remark: Acc. to the methodology, the QAL1 test is not mandatory if the AMS passes QAL2. This was proved by the PP.
		  • QAL 2: commissioning and validation of an AMS
		  An accredited laboratory, in this case Müller BBM, (acc. ISO 17025) carries out specific testing procedures to verify that the AMS installation meets the accuracy requirements laid down by EN 14181. The performance of the complete installation was compared against a
			/QAL2 INST/ /QAL2 CAL/ /QALPE RF/ /CDMA/ /NAP1/ NAP2/ /PROC2 – PROC7/ /FICHE/ /AST/ /THERM O/		~~CAR C1~~ ~~CL C3~~ Pls. see Chapter 4	OK

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		series of measurements made with approved Standard Reference Methods. QAL 2 was carried out in September 2010. • QAL 3: ongoing operation and maintenance The PP implemented a quality assurance system to prove the ongoing compliance of the AMS with the norm. The maintenance activities are monitored and controlled as part of an overall quality assurance programme. • AST: Annual Surveillance Test The PP verifies the continuing validity of the calibration function on yearly basis. The requirements and responsibilities for carrying out the AST tests are the same as for QAL 2. QAL2 was carried out in 2010 and AST in 2011 (27-28/09/2011) and 2012 (13-14/09/2012). *Other monitoring installations, equipment and devices:* Operation maintenance and calibration intervals are carried out by qualified and trained staff from the instrument department according to own and vendor´s specification. Activities are controlled and documented as part of the implemented quality assurance programme. *Means of determination:* Methodology, EN14181, interview				

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		with monitoring manager of the plant, check of relevant documents and records. *Conclusion:* The function of the monitoring equipment is guaranteed by regular inspections and calibration. The procedures are embedded in the internal and external QA/QC procedures.				
E.3	*DVM § 101c)* Are the evidence and records used for the monitoring maintained in a traceable manner?	*Description:* All monitoring data are collected from the MMD as 4-20 mA signal and forwarded to the plant DCS. A data extract of hourly mean values of different measuring points used for regular plant monitoring and from the AMS is reported to the assessment team (at N.serve). *Means of determination:* Excel-datasheet for ER-calculation, data logger at plant with raw data collection provided by the plant operator during on-site visit (spot-check of single days) *Conclusion:* No issues were found with this regard. But since there are data to be verified after the on-site visit on 2012-11-20, the verification team communicated to the PP which data are necessary to verify the remaining 2 months. CAR E2: For the remaining period (11/12 and 12/12) following docs shall be provided: 1. Projet domestique event sheet.	/XLS/			OK

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		2. Monthly report to the government regarding emissions of NOx and N_2O and Nitric Acid output. 3. Raw data set. 4. A1048 XLS-sheet including monthly calibration of AMS.				
E.4	*DVM § 101d)* Is the data collection and management system for the project in accordance with the monitoring plan?	*Description:* All process data relevant to the project activity are properly generated in the MMD, transferred by DCS to the PCS and stored on the plant server. Hourly mean values were automatically calculated. Operating hours of the plant and AMS where generated from the production log taking into account the operation of the plant within the trip points limits. Trip limits: Minimum oxidation temperature: 740 °C Maximum oxidation temperature: 920 °C Maximum ammonia to air ratio: 11.8 % *Means of determination:* Records of the PCS compared with raw data sheet in the ERU calculation and compared monitoring plan of PDD. *Conclusion:*	/TAG/ /PDD/ /MR/ /XLS/			OK

No.	DVM[5] paragraph / Checklist Item (incl. guidance for the determination team)	Initial Finding (Means and results of assessment)	Ref.	Action requested to PPs (CAR, CL, FAR)	Review of PP´s action	Con-clu-sion
		The PP implemented a state-of-the-art plant operation and data collection system. The verifier concludes that the data collection and management system for the project is in compliance with the monitoring plan and relevant rules and regulations. Nevertheless issues need to be addressed in the monitoring report according CAR C1: - The measurement frequency of all Data and Parameters has to be reported in Annex 1 according to the methodology. - Information about project data storage and duration are missing. No further issues were found with this regard.				