



South Asia

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Verification and Certification Report

of the Registered CDM Project

“Catalytic N₂O destruction project at the new nitric acid plant
PANNA 4 of Enaex S.A.”

UNFCCC reference number: 5393

Monitoring Period #04: 01/10/2012 to 18/03/2013

Report No.: 00142HA

13 September 2013

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Date of first issue of this report	22/08/2013
Revision No. of this report	2
Registered PDD (version/date)	Version 1.2 - 28/09/2011
Registration date	30/11/2011
Revised Monitoring Plan	N/A
Methodology (title; number; version)	N2O abatement from nitric acid production; ACM0019; Version 01.0.0
Crediting period	19/12/2011 to 18/12/2021(fixed)
Published Monitoring Report (version/date)	Version 1 - 26/07/2013
Final Monitoring Report (version/date)	Version 2 - 26/08/2013
Scope	5
Technical Area	5.1
Location of the Project	Barrio Industrial s/n; Mejillones, Antofagasta, Chile GPS coordinates: -23.097400 , -70.430153
Project Participant	Enaex S.A. (contractor) Carbon Climate Protection GmbH Mitsubishi Corporation
Project Documentation Link	http://cdm.unfccc.int/Projects/DB/RWTUV1320421146.84/view

VERIFICATION AND CERTIFICATION CONCLUSION

TÜV SÜD South Asia Pvt. Ltd. has performed the periodic verification of the aforementioned CDM project activity. The verification is based on the currently valid documentation of the United Nations Framework Convention on Climate Change (UNFCCC).

The management of Enaex S.A. is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the project's Monitoring Plan indicated in the registered PDD and the applied methodology.

The verifier can confirm that:

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the project is operated as planned and described in the project design document approved by the EB;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements;
- the monitoring plan in Monitoring Report is as per the PDD and monitoring plan approved by the EB;
- the monitoring plan in the approved PDD is as per the applied methodology;
- There is an audit trail that contains the evidence and records that validate the stated figures.

Based on the information we have seen and evaluated, we confirm that the project activity

achieved the verified amount of reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the project activity.

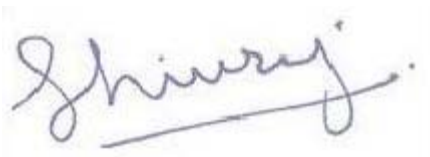
Verified emission reductions in this monitoring period: 134 275 t CO_{2e}

Baseline: 188 248 tCO_{2e}

Project emissions: 53 973 tCO_{2e}

Leakage: 0 tCO_{2e}

Pune, 13/09/2013



Shivraj Sharma
Member of Certification Body "Environment
and Energy" TÜV SÜD South Asia

Abbreviations

ACM	Approved Consolidated Methodology
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM-EB	CDM Executive Board
CER	Certified Emission Reduction
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO_{2e}	Carbon dioxide equivalent
CR / CL	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRL	Information Reference List
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
PCP	Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PS	Project Standard
TÜV SÜD	TÜV SÜD South Asia Pvt. Ltd
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation And Verification Standard

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1 METHODOLOGY

1.1 Objective

TÜV SÜD has been commissioned by the aforementioned client to perform an independent verification assessment.

The objective of the verification work is to comply with the requirements of paragraph 62 of the CDM Modalities and Procedures. According to this assessment TÜV SÜD shall:

- ensure that the project activity has been implemented and operated as per the registered PDD and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place,
- ensure that the published MR and other supporting documents provided are complete, verifiable and in accordance with applicable CDM requirements,
- ensure that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology,
- evaluate the data recorded and stored as per the applicable requirements.

1.2 Scope

The verification scope encompasses an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the Designated Operational Entity. The verification is based on the submitted monitoring report, the validated project design documents including its monitoring plan and validation report, previous verification reports (if any), the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the EB and any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

Based on the requirements in the VVS, TÜV SÜD has applied a rule-based approach for the verification of the project. The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion.

The verification considers both quantitative and qualitative information on emission reductions.

The verification is not meant to provide any consultancy towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

1.3 Verification Process

The information provided by the project participants is assessed by applying the means of verification specified in the VVS and in the absence of specific means of verification specified in the VVS the standard auditing techniques are applied.

Once TÜV SÜD receives the Monitoring Report and a confirmation from any PP to upload, the MR is made publicly available through a dedicated interface on the UNFCCC CDM website.

A competent assessment team is selected prior to the start of the verification. The team is selected to cover the technical area(s), sectoral scope(s) and relevant host country experience for evaluating the CDM project activity. Additionally a competent Technical Reviewer or Technical Reviewer Team is appointed to conduct checks on quality and completeness.

The verification team performs first a desk review, followed by an on-site visit, which results in the formation of a draft report and a list of findings. The next step involves the evaluation of the findings through direct communication with the PPs and then finally the preparation of the

verification report. This verification report and other supporting documents then undergo an internal quality control by the CB “Environment and energy” before submission to the CDM-EB.

1.4 Appointment of the Team

According to the technical scopes and experiences in the sectoral or national business environment, TÜV SÜD has composed an assessment team in accordance with the appointment rules of the TÜV SÜD Certification Body “Environment and Energy”.

The composition of an assessment team has to be approved by the Certification Body (CB) to assure that the required skills are covered by the team. The CB of TÜV SÜD operates the following qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL);
- Verifier (V);
- Verifier Trainee (T);
- Technical Experts (TE);
- Country expert (CE);
- Technical reviewer (TR).

It is required that the sectoral scope(s) and the technical area(s) (TA) linked to the methodology/ies and project have to be covered by the assessment team. Appointment certificates of the selected team members are attached to this report as Annex.

Assessment Team:

Name	Qualification	Scope	Technical Area	Host country experience	Onsite visit
Hammer, Martin	ATL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (All)	-	-
Tolcach, Eric Rodolfo	V	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tollio Vanhaz, Dante Luis	TE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (All)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Technical Reviewer:

Name	Qualification	Scope	Technical area
Castro, Javier	TR	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (All)

1.5 Review of Documents

Publication has been initiated before the verification activities started. Based on the published MR the assessment team performed a desk review to:

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

A complete list of all documents reviewed is available in the Information Reference List attached as Annex 2 to this report.

1.6 On-site Assessment and follow-up Interviews

During on-site visit (dates of on-site visit 19/08/2013 – 20/08/2013) TÜV SÜD performed a physical site inspection and interviewed project stakeholders to:

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

A list of all persons interviewed is included in the IRL attached as Annex 2 to this report.

1.7 Resolution of Clarification and Corrective and Forward Action Requests

The objective of this phase of the verification is to resolve the requests for corrective actions, clarifications, and any other outstanding issues which need to be clarified for TÜV SÜD's conclusion on the achieved emission reductions. The CARs and CRs raised by TÜV SÜD are resolved during communication between the client and TÜV SÜD. To guarantee the transparency of the verification process, the concerns raised and responses that have been given are documented in detail in the List of Findings that is attached as Annex 1 to this report.

1.8 Internal Quality Control

Internal quality control within the team is assured by means of a technical review process that takes place after the on-site assessment and after closure of findings. The internal quality control in the verification process is given by the final decision (Verification and Certification Conclusion) made by the CB "Environment and Energy".

2 REPORTING REQUIREMENTS

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

2.1 FARs from Validation / Previous Verification

The verification team confirms that all FARs presented in the validation report and/or previous verification reports have been correctly addressed by the PPs.

Outstanding Requests from Validation	During the first verification process, the verifier shall be checked that appropriate training has been carried out among the people involved in the project.
Summary of project owner response	Evidence of appropriate training of the people involved in the project was provided to the assessment team.
Conclusion	<input checked="" type="checkbox"/> This Finding has been closed during 1 st Verification.

Outstanding Requests from 1st Verification	After identification of a problem in the programming of automatic QAL3 procedure, PPs switched to manual QAL3 mode in the first monitoring period. When switching back to automatic QAL3 mode, sufficient evidences on the proper functioning of automatic QAL 3 shall be provided.
Summary of project owner response	N/A as discussed during onsite visit.
Conclusion	<input checked="" type="checkbox"/> This Finding has been closed during 2 nd Verification

2.2 Project Implementation in accordance with the registered Project Design Document

The project is fully implemented according to the description presented in the registered PDD. The verifier confirms, through the visual inspection that all physical features of the proposed CDM project activity including data collecting systems and storage have been implemented in accordance with the registered PDD. The project activity is completely operational and the same has been confirmed during the on-site visit. Some shut downs of the nitric acid plant occurred during this monitoring period, but the secondary N₂O abatement system (project activity) was never removed or out of operation.

The difference in the values does not lead to a substantial increment of the ER in this period and it is not expected that it will lead to an increment in future periods in relation to the estimates in the registered PDD.

2.3 Compliance of the Monitoring Plan with the Monitoring Methodology

The monitoring plan is in accordance with the approved methodology applied by this CDM project activity. Neither a revision nor a deviation to the monitoring plan has been requested to the CDM Executive Board.

2.4 Compliance of the Monitoring with the Monitoring Plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD. All parameters were monitored and determined as per the Monitoring Plan.

Data transfer from meters to the monitoring report is realized as follows:

The instruments transmitters convert the primary sensing signal (resistance, voltage, Infrared light, etc.) to a 4 - 20 mA analogue signal according to range and units configured. These signals are hardwired transmitted to I/O cards (analogue input cards) and collected by the DeltaV Processor. These digital values are made available in the fibre optics network to be processed, among others, in controller blocks, other variables calculations and DeltaV Continuous Historian Server (CHS). Modifications of the Delta V, which are protected by security levels by the supplier, are tracked by a Version Control Tool. The CHS is installed in the ProPlus station where the information of field process variables are stored. The hourly averages (.csv-files) were manually transferred to the Excel Calculation Tool followed by a quality procedure.

To calculate the Emission Reductions, two Excel Files are available.

- Step 1: Transfer to the Excel Tool. No manual recalculations applied.
- Step 2 Calculation based on the transferred data according to the applied methodology and tool and any manual recalculation.

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

Data / Parameter:	$P_{NA,n}$
Data unit:	tHNO ₃
Description:	Nitric acid produced in the monitoring period n
Source of data used:	<p>The coriolis type mass flow meter and the integrated density measurement device deliver values, which are used as basis for calculation of the concentration (taking into consideration the measured temperature of the nitric acid). The nitric acid at 100% is calculated by multiplying the mass flow with the concentration. Then nitric acid produced is automatically recorded in the Delta V system and provided as hourly averages in Excel sheet which is derived from Delta V system (csv.files).</p> <p>The equipment used has been calibrated according to the requirements specified by the approved monitoring plan of the registered PDD. The instruments are calibrated according to the manufacturer's specification (IRL 6a, 6c). The calibration certificates were provided as evidence of the calibration work performed (IRL 7a, 7e). Hence it is confirmed that calibration was not delayed.</p>
Means of verification/Comments:	Data provided in the raw data sheet and raw data to calculate HNO ₃ concentration (IRL 9b, IRL 9c) were traced by the verifier with the help graphs over the whole period. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given. The reported data found to be consistent with the ProPlus graphs.

	DeltaV Monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.
Cross-check	<p>PPs provided daily production data for this monitoring period “Listado de Producciones Diarias Planta Prillex América” (IRL 12b) that includes data recorded manually once every day from Foxboro DCS . The verifier could crosscheck reported nitric acid production of the monitoring period in MR with this data source. The difference was found to in a reasonable range. In addition the calculation of HNO₃ concentration (based on density and temperature of HNO₃ produced) has been crosschecked with empirical values of HNO₃ temperature, density and concentration.</p> <p>The nitric acid plant has a designed capacity (= nameplate capacity) of 925 mtpd HNO₃ (100%) according to PDD. This has been confirmed by the plant supplier Técnicas Reunidas (IRL 4i). Further, it has also been confirmed by the plant supplier that reserves were necessarily incorporated during plant design. The actual capacity shall not be understood as overproduction of nitric acid, but as exploitation of state-of-the-art reserves in the plant design.</p> <p>The highest daily production rate during this period did not exceed the design margins mentioned by the plant supplier (IRL 4i).</p>

Data / Parameter:	h_n
Data unit:	-
Description:	Number of hours of operation in a monitoring period n
Source of data used:	<p>According to PDD the hours of operation are determined by the oxidation Temperature in the AOR.</p> <p>The temperature is reported automatically by three independent measurement points (TAG numbers TT-45030A – C) measuring the temperature at the same time. The value of the instrument with the TAG number TT-45030A was selected as main signal for monitoring the operation temperature; TT-45030B and TT-45030C are used as back-up signals in case TT-45030A is not fully functional.</p> <p>The oxidation temperature is automatically recorded in the Delta V system and provided as hourly averages in Excel sheet which is derived from Delta V system (csv.files).</p> <p>Type: digital (DCS)</p> <p>The plant is considered to be in operation when the temperature is in a range from 850°C to 905°C. The range has been validated (IRL 1b).</p> <p>The equipment used has been calibrated according to the requirements of as specified by the approved monitoring plan of the registered PDD. The instruments are calibrated according to the manufacturer’s specification (IRL 6b). The calibration certificate was provided as evidence of the calibration work performed (IRL 7d). Hence it is confirmed that calibration was not delayed.</p>
Means of verification/Comments:	<p>Data provided in the raw data sheet were traced by the verifier with the help of ProPlus graphs over the whole period. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given.</p> <p>DeltaV Monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.</p>
Cross-check	<p>To cross-check the data the values of the three thermocouples TT-45030A TT-45030B and TT-45030C were compared to each other.</p> <p>The values were found to be consistent over the period except those periods with instrument problems (30/10/2012, 26/12/2012 and 23/02/2013). During those periods the back-up instrument TT-45030B has been used.</p>

Data / Parameter:	$V_{t,db}$
Data unit:	m ³ dry gas/h
Description:	Volumetric flow of the gaseous stream in time interval t on a dry basis
Source of data used:	<p>The total gas volume is continuously measured by a DURAG DFL 100 DS and automatically recorded in the Delta V system and the data is provided as hourly averages in Excel sheet which is derived from Delta V system (csv.files).</p> <p>The equipment used has been calibrated according to the requirements as specified by the applied methodology.</p> <p>The correction factors derived from the calibration curve for the monitoring components as determined during the QAL2-test in accordance with EN14181 are applied to both the N₂O concentration and the volume flow of the tail gas. The QAL2 parameters are applied to the calculated hourly averages as part of the calculation of project emissions in the Excel calculation tool (IRL 10). This is in accordance with the applied methodology.</p> <p>The QAL2 report (IRL 7b) was provided as evidence of the calibration work performed. Hence it is confirmed that calibration was not delayed. In addition the AST was performed in accordance with the applicable standard EN14181 by an accredited third party institute. The AST has confirmed the the validity of the applied QAL2 parameters.</p>
Means of verification/Comments:	<p>Data provided in the raw data sheet were traced by the verifier with the help of ProPlus graphs over the whole period. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given.</p> <p>The DeltaV monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.</p>
Cross-check	In order to ensure the integrity of the data, the verification team reviewed the series of hourly data in parallel with other parameters including to make graphs in the Excel file calculation sheets submitted, e.g. to see peculiarity in the graph shape, to check the similarity between nitric acid produced and tail gas flow, to see the overall integrity of oxidation temperature. The data were found to be plausible.

Data / Parameter:	$V_{i,t,db}$
Data unit:	m ³ gas i/m ³ dry gas
Description:	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis
Source of data used:	<p>The volumetric fraction of N₂O is continuously measured by a non-dispersive infrared photometry for N₂O and automatically recorded in the Delta V system and provided as hourly averages in Excel sheet which is derived from Delta V system (csv.files).</p> <p>The equipment used has been calibrated according to the requirements as specified by the applied methodology. The correction factors derived from the calibration curve for the monitoring components as determined during the QAL2-test in accordance with EN14181 are applied to both the N₂O concentration and the volume flow of the tail gas. The QAL2 parameters are applied to the calculated hourly averages as part of the calculation of project emissions in the Excel calculation tool (IRL 10). This is in accordance with the applied methodology. The QAL2 report (IRL 7b) provided as evidence of the calibration work performed. Hence it is confirmed that calibration was not delayed.</p>
Means of verification/Comments:	<p>Data provided in the raw data sheet were traced by the verifier with the help of ProPlus graphs over the whole period. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given.</p> <p>DeltaV Monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.</p>

	In regard to applied default values in case measurement data are not available, the verifier confirms that the procedure according to the applied methodology is correctly applied.
Cross-check	In order to ensure the integrity of the data, the verification team reviewed the series of hourly data in parallel with other parameters including to make graphs in the Excel file calculation sheets submitted, e.g. to see peculiarity in the graph shape, to check the similarity between nitric acid produced and tail gas flow and N ₂ O concentration. The data were found to be plausible.

Data / Parameter:	T _t
Data unit:	K
Description:	Temperature of the gaseous stream in time interval t
Source of data used:	<p>The temperature of tail gas is continuously measured by a PT 100 resistance thermometer and automatically recorded in the Delta V system and provided as hourly averages in Excel sheet which is derived from Delta V system (csv.files).</p> <p>The equipment used has been calibrated according to the requirements of as specified by the applied methodology. The instruments are calibrated according to the manufacturer's specification (IRL 6d).</p> <p>The calibration certificate (IRL 7c) was provided as evidence of the calibration work performed. Hence it is confirmed that calibration was not delayed.</p>
Means of verification/Comments:	<p>Data provided in the raw data sheet were traced by the verifier with the help of ProPlus graphs over the whole period. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given.</p> <p>DeltaV Monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.</p>
Cross-check	In order to ensure the integrity of the data, the verification team reviewed the series of hourly data in parallel with other parameters including to make graphs in the Excel file calculation sheets submitted, e.g. to see peculiarity in the graph shape, to check the similarity between nitric acid produced and tail gas flow and N ₂ O concentration. The data were found to be plausible.

Data / Parameter:	P _t
Data unit:	Pa
Description:	Pressure of the gaseous stream in time interval t
Source of data used:	<p>Static and atmospheric pressure data are continuously measured by Capacitive pressure transducers and data is automatically recorded in the Delta V system and provided as hourly averages in Excel sheet which is derived from Delta V system (csv.files).</p> <p>DeltaV Monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.</p> <p>The equipment used has been calibrated according to the requirements of as specified by the applied methodology. The instruments are calibrated according to the manufacturer's specification (IRL 6d).</p> <p>The calibration certificates (IRL 7f, IRL 7g) were provided as evidence of the calibration work performed.</p> <p>In regard to the delayed calibrations the verifier has checked the calibration certificates and manufacturers specification of the instruments. Hence the verifier can confirm in accordance with VVS (IRL 2g) para 238 and para 239 that (a) the results of the delayed calibration do not show any errors (IRL 7f and IRL 7g), (b) the error is smaller than the maximum permissible error indicated by the instrument manufacturer (IRL 6i), (c) the error has been applied in a conservative manner (IRL 10b), (d) all measured hourly values taken during the period between the scheduled date of calibration and the actual date of calibration (IRL 10b, IRL 7f and IRL 7g).</p>

Means of verification/Comments:	Data provided in the raw data sheet were traced by the verifier with the help of ProPlus graphs over the whole period. In case of peculiarities the graph was zoomed and checked with special awareness taking into consideration the specific operation of the facility as demonstrated by other related parameter to verify explanations given. DeltaV Monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool. During those hours where the instruments were out of operation due to calibration activities, PPs have applied downtime procedure according to the applied methodology as verified by reviewing the formulas applied in the Excel calculation tool (IRL 10b).
Cross-check	In order to ensure the integrity of the data, the verification team reviewed the series of hourly data of static pressure in parallel with other parameters including to make graphs in the Excel file calculation sheets submitted, e.g. to see peculiarity in the graph shape, to check the similarity between nitric acid produced and tail gas flow and N ₂ O concentration. The data were found to be plausible.

Data / Parameter:	C _{H₂O,t,db,n}
Data unit:	mg H ₂ O/m ³ dry gas
Description:	Moisture content of the gaseous stream at normal conditions, in time interval t
Source of data used:	Measurements according to USEPA CF 42 method 4 – Gravimetric determination of water content (AST Report).
Means of verification/Comments:	Option A of the tool can be applied, as the moisture content is less than 0.05 kg H ₂ O/m ³ dry gas. The highest measured value according to AST report (IRL 8c) is 0.0036 kg H ₂ O/m ³ dry gas (= 3,600 mg H ₂ O/m ³ dry gas).
Cross-check	The validating DOE mentions (IRL 1b): <i>In the mass balance, the expected moisture content given by the technology supplier at design operation conditions is far below 0.05 kgH₂O/m³ dry gas. Although the mass balance is given for design operating conditions not considering the presence of the secondary catalyst, this value is deemed to be acceptable since the secondary catalyst only affects the composition of the gas in terms of N₂O.</i> The moisture content measured during AST by third party is in compliance with the observations of validating DOE.

2.5 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions

All data has been available and all the parameters have been monitored in accordance with the registered monitoring plan. Conservative default values and values from back up meter have been used in accordance with the registered monitoring plan as explained above in chapter 2.4. The reported data have been cross-checked against other sources available as explained above in chapter 2.4.

The verifier confirms that the methods and formulae used to obtained the baseline, project and leakage emissions are appropriate. The same has been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology.

The verifier confirms that the monitoring report includes all parameters and the monitored data at the intervals required by the methodology and PDD.

The verifier confirms that all the emission factors and default values (ex-ante values from PDD) have been correctly justified. No assumptions have been applied by the project participant. All the emission factors and default values are explicitly mentioned in the monitoring report.

The emissions reductions achieved during this monitoring period are lower than estimated in PDD.

The amount of emission reductions of this monitoring period has changed compared to the initial amount reported in the published Monitoring Report version 1 from 136,221 to 134,275 tCO₂e. This is mainly a result of CAR01.

Ex-ante values from PDD – not monitored parameters

Data / Parameter:	EF _{default,y}
Data unit:	kgN ₂ O/tHNO ₃
Description:	Default N ₂ O baseline emissions factor in the calendar year y of the monitoring period n
Source of data used:	According to PDD and ACM0019 version 01.0.0.
Means of verification/Comments:	The applied emissions factors have been compared with the default value given in the PDD and applied methodology. The correct values are applied.
Cross-check	Not applicable

Data / Parameter:	GWP _{N₂O}
Data unit:	tCO ₂ e/tN ₂ O
Description:	Global warming potential of N ₂ O valid for the commitment period
Source of data used:	According to PDD and ACM0019 version 01.0.0.
Means of verification/Comments:	The applied value has been compared with the default value given in the PDD and applied methodology. The correct value is applied.
Cross-check	Not applicable

Data / Parameter:	R _u
Data unit:	Pa.m ³ /kmol.K
Description:	Universal ideal gases constant
Source of data used:	According to PDD and “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0.0)
Means of verification/Comments:	The applied value has been compared with the default value given in the PDD and applied methodology. The correct value is applied.
Cross-check	Not applicable

Data / Parameter:	MM _i
Data unit:	kg/kmol
Description:	Molecular mass of N ₂ O
Source of data used:	According to PDD and “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0.0)
Means of verification/Comments:	The applied value has been compared with the default value given in the PDD and applied methodology. The correct value is applied.
Cross-check	Not applicable

Annex 1

List of Findings

List of Findings - Compilation and Resolutions

Project Title: Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.

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Definitions contained in the Glossary of CDM terms and applied in the Standard	
Shall / Should / May	In addition to the definitions contained in the Glossary of CDM terms, the following terms apply in the VVS (VVS/10): <u>Shall</u> is used to indicate requirements to be followed; <u>Should</u> is used to indicate that among several possibilities, one course of action is recommended as particularly suitable; <u>May</u> is used to indicate what is permitted.
Credible	Information is credible if it is authentic and is able to inspire belief or trust, and the willingness of persons to accept the quality of evidence. (VVS/17)
Reliable	Information is reliable if the quality of evidence is accurate and credible and able to yield the same results on a repeated basis. (VVS/17)
CAR	The DOE shall raise a CAR if one of the following situations occur: (VVS/220) (a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient; (b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants; (c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions; (d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.
CL	The DOE shall raise a CL if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. (VVS/221)
FAR	The DOE shall raise a FAR during verification for actions if the monitoring and reporting require attention and/or adjustment for the next verification period. (VVS/223)

Compilation and Resolutions of CARs, CRs and FARs

Corrective Action Requests by the assessment team		
	Comments and Results	Conclusion and IRL
Issue	GWP of 310 is applied for the whole monitoring period from 01/10/2012 to 18/03/2013	<input checked="" type="checkbox"/>
Requirement	4/CMP.7 Decides that, for the second commitment period of the Kyoto Protocol, the global warming potentials used by Parties to calculate the carbon dioxide equivalence of anthropogenic emissions by sources and removals by sinks of the greenhouse gases listed in Annex A to the Kyoto Protocol shall be those listed in the column entitled "Global Warming Potential for Given Time Horizon" in table 2.14 of the errata to the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, based on the effects of greenhouse gases over a 100-year time horizon, taking into account the inherent and complicated	This Finding is closed IRL 1f IRL 10b

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	<p>uncertainties involved in global warming potential estimates.</p> <p>Applied Methodology ACM0019 Version 1 for parameter GWP: Source of Data: Relevant decision by CMP.</p> <p>EB 69 Report Annex 3 All monitoring, verifications and requests for issuance of certified emission reductions (CERs) in respect of emission reductions and removals achieved by CDM project activities and PoAs in the second commitment period (from 1 January 2013) shall be calculated using the GWPs as applied by decision 4/CMP.7.</p>	
Corrective Action Request	<p><u>Corrective Action Request No.1</u></p> <p>The calculation of Emission Reductions shall consider decision 4/CMP.7 and EB 69 Report Annex 3.</p>	
Response	<p>The calculation of Emission Reductions was corrected considering the decision 4/CMP.7 and EB 69 Report Annex 3. The GWP value is 310 for the period between October 1st, 2012 and December 31st, 2012. Between January 1st, 2013 and March 18th, 2013 the value for the GWP is 298. The respective documents were provided by the assessment team.</p>	
Assessment Means of verification	<p>The assessment team reviewed the revised Excel Calculation Tool (IRL 10b) with special focus on the applied GWP. A GWP of 298 was found to be applied from 01st January 2013 onwards according to the requirements. The information in the Excel File (IRL 10b) and revised MR (IRL 1f) were found to be consistent.</p>	
Changes in the monitoring report or supporting annexes	<p>The Excel Calculation Tool (IRL 10b) has been revised to report the CERs for each commitment period separately considering the changed GWP. Due to the revised calculation the number of CERs has changed slightly. The information in the MR (IRL 1f) regarding number of CERs and applied GWP has been changed accordingly.</p>	
Issue	<p>The N₂O analyser (AT-45094C) was out of order on 27/10/2012 from 03:00 – 16:00. PPs apply a default value for that period derived from all monitored N₂O concentration values except those during plant shut downs.</p>	<p><input checked="" type="checkbox"/></p> <p>This Finding is closed</p>

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Requirement	Applied Methodology ACM0019 version 1 If data for either the N ₂ O concentration or the volume or mass flow of the tail gas are not available for more than 1/3 of any hour while the plant was in operation, the value for that hour shall be replaced with the maximum value of N ₂ O concentration or volume or mass flow of the tail gas observed during the monitoring period. If data for neither the N ₂ O concentration nor the volume or mass flow of the tail gas are available for more than 1/3 of any hour while the plant was in operation, the maximum value of mass flow of N ₂ O calculated during the monitoring period shall be applied to any such hour. Values observed during five operating hours before and after a plant start-up and shut-down shall not be used for the determination of the maximum values;	IRL 10b
Corrective Action Request	<u>Corrective Action Request No.2</u> The set of data used to calculate the default value shall follow the requirement of the applied methodology.	
Response	The set of data used to calculate the default value was corrected accordingly in the excel spread sheet and the corrected file "UNFCCC Summary" was provided to the assessment team.	
Assessment Means of verification	The assessment team reviewed the revised Excel Calculation Tool (IRL 10b) with special focus on the calculation of the applied default value. The calculation of the default value has been corrected to consider only those values specified in the applied methodology (" <i>Values observed during five operating hours before and after a plant start-up and shut-down shall not be used for the determination of the maximum values</i> ")	
Changes in the monitoring report or supporting annexes	The formula to calculate the maximum value of N ₂ O concentration has been corrected in the Excel Calculation Spreadsheet. However, the calculated maximum value did not change.	
Issue	<ol style="list-style-type: none"> PPs report in the Excel spreadsheet "05 Moisture Content CH₂O,t,db,n" about an QAL2 on 24/09/2012 that was actually not a QAL2 but an AST Different values for the "Nitric acid produced in the monitoring period" were found to be reported in the MR Excel File 	<input checked="" type="checkbox"/> This Finding is closed IRL 1f IRL 10b

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Project Title: Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.

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Requirement	VVS 17d: In carrying out its validation and verification work, the DOE shall: Assess the accuracy, conservativeness, relevance, completeness, consistency, and transparency of the information provided by project participants	
Corrective Action Request	<u>Corrective Action Request No.3</u> (1) QAL2/AST dates shall be correctly reported. (2) The values in the MR and Excel shall be reported consistently.	
Response	(1) The Report Type of QAL2/AST tests were corrected in the excel spread sheet and the corrected file "UNFCCC Summary" was provided to the assessment team. (2) The value of "Nitric acid produced in the monitoring period" was corrected in the MR and the corrected MR was provided to the assessment team.	
Assessment Means of verification	The assessment team reviewed the revised Monitoring Report (IRL 1f) and Excel Calculation Tool (IRL 10b) with special focus the above mentioned issues. Both issues were found to be corrected.	
Changes in the monitoring report or supporting annexes	The typos in the MR and Excel File were corrected.	

Issue	PPs report in the MR Chapter E.7. the actual emission reductions 255,006 tCO ₂ e for 2012, but the actual amount of emission reductions are different.	<input checked="" type="checkbox"/> This Finding is closed IRL 1f
Requirement	Guideline for Completing the monitoring report form version 03.2: If the monitoring period starts before 31 December 2012 and ends anytime thereafter, provide actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved for the following two periods respectively: (a) Up to 31 December 2012 (1st commitment period); and (b) From 1 January 2013 onwards. The achieved GHG emission reductions or net anthropogenic GHG removals by sinks should be calculated proportionally for each period. In cases where annual caps were applied in the calculations, the annual caps should be pro-rated to each period.	
Corrective Action Request	<u>Corrective Action Request No.4</u> The actual emission reductions shall be reported in Chapter E.7. according to the Guideline for	

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	Completing the monitoring report form version 03.2:	
Response	The actual emission reductions achieved until December 31st, 2012 are reported now in Chapter E.7. according to the Guideline for Completing the monitoring report form version 03.2. The corrected MR was provided to the assessment team.	
Assessment Means of verification	The assessment team reviewed the revised Monitoring Report (IRL 1f) with special focus on the reported values in Chapter E.7. The actual emission reductions were found to be correctly reported for the years 2012 and 2013.	
Changes in the monitoring report or supporting annexes	The values in Chapter E.7. have been revised.	

Issue	A delay in calibration for the static and atmospheric pressure instruments PT-45091 and PT-45095 occurred from 08/01 – 09/01/2013 which is also reported in the Excel File. However the formulas to correct the values because of those delays are deficient.	<input checked="" type="checkbox"/> This Finding is closed IRL 10b
Requirement	<p>VVS § 238. If, during verification of a certain monitoring period, the DOE identifies that the calibration has been delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), the DOE may conclude its verification, provided the following conservative approach is adopted in the calculation of emission reductions:</p> <p>(a) Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error; or</p> <p>(b) Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment.</p>	
Corrective Action Request	<p><u>Corrective Action Request No.5</u></p> <p>The procedure for data treatment in case of delayed calibration shall be correctly applied.</p>	
Response	The data treatment in case of delayed calibration was corrected in the excel spread sheet and the corrected file “UNFCCC Summary” was provided to the assessment team.	

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Assessment Means of verification	The assessment team reviewed the revised Excel Calculation Tool (IRL 10b) with special focus on the data treatment in case of delayed calibrations. The data treatment was found to be in accordance with the procedure specified in the VVS §238 (a).	
Changes in the monitoring report or supporting annexes	The data treatment in case of delayed calibration has been revised with very minor impact to the amount of CERs.	

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Clarification Requests by the assessment team		
	Comments and Results	Conclusion and IRL
Issue	The graphical analysis of the atmospheric pressure values shows a sudden lower level of atmospheric pressure between 10/11/2012 and 10/12/2012.	<input checked="" type="checkbox"/> This Finding is closed IRL 1f IRL 10b
Requirement	VVS 17d: In carrying out its validation and verification work, the DOE shall: Assess the accuracy, conservativeness, relevance, completeness, consistency, and transparency of the information provided by project participants	
Clarification Request	<u>Clarification Request No. 1</u> PPs shall clarify the situation.	
Response	The instrument calibration periodicity is one month. On 10/11/2012 a calibration was performed, since that moment the instrument measured with a deviation. This deviation was detected and corrected on 10/12/2012 with a new calibration. The error detected (975 Pa) was added conservatively in the excel spread sheet to the measurements to all the reported measurements between valid calibrations. The corresponding values were corrected in the monitoring report. The corrected files were provided to the assessment team.	
Assessment Means of verification	The assessment team reviewed the revised Excel Calculation Tool (IRL 10b) with special focus on the data treatment between 10/11/2012 and 10/12/2012. The identified deviation according to the calibration certificate of the atmospheric pressure device TAG PT-45095 from 10/12/2012 (IRL 7g) was found to be added to all the reported measurements between valid calibrations. The assessment team performed a graphical check of the atmospheric pressure values over the monitoring period and thus found a plausible trend.	
Changes in the monitoring report or supporting annexes	The error detected (975 Pa) was added conservatively in the excel spread sheet to the measurements to all the reported measurements between valid calibrations.	

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Forward Action Requests by the assessment team		
	Comments and Results	
Issue	<p>The N₂O analyser can be operated in two different measurement ranges (range1: 0...200 ppm and range 2: 0... 2000 ppm). There is no alarm in the system that is activated when the measurement goes from one range to the other. However, the system is prepared for identifying both ranges and different paths are taken by the system. During this verification period, this situation has been verified and all the data is correctly used.</p> <p>Nonetheless, there is no recording of those events in order to confirm when the system takes one way or the other.</p>	
Requirement	Applied methodology ACM 0019 version 1: The correction factors derived from the calibration curve of the QAL2 audit for the monitoring components as determined during the QAL2-test in accordance with EN14181 must be applied to both the N ₂ O concentration and the volume or mass flow of the tail gas.	
Forward Action Request	<p><u>Forward Action Request No. 1</u></p> <p>PPs shall record which measuring range was used by the analyser.</p>	
Response	The N ₂ O analyser is operated in two different measurement ranges (range1: 0...200 ppm and range 2: 0... 2000 ppm) the change of ranges is automatically performed by DeltaV Control System according with the measurements. However, PP will implement this signal of range change in to the historian of the control system in order to confirm when the system takes one range or the other.	
Means of verification	<i>Applicable for next verification</i>	
Any resulting changes in the monitoring report or supporting annexes	<i>Applicable for next verification</i>	

Annex 2

Information Reference List


Project title: Catalytic N2O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.” (UNFCCC Ref-Nr. 5393)

Interviewed Persons during onsite assessment:


Name	Function	Company
Ricardo Camus R.	CDM Operations Leader	ENAEX S.A.
Claudia Bravo	Process Engineer	ENAEX S.A.
Carlos Araneda	Process Engineer	ENAEX S.A.

Other Interviewed Persons (during onsite assessment via Web Conference):


Name	Function	Company
Sonja Bichler	Project Manager	Carbon Climate Protection GmbH

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Ref. No.	Author/Editor/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date	Additional Information (Relevance in CDM context)
1	ENAEX S.A. TÜV SÜD TÜV NORD	<u>Monitoring Report, Project Design Documents, Previous Verification Reports</u> <ul style="list-style-type: none"> a. PDD of the CDM Project “Catalytic N2O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.” (CDM Registration N° 5393), version 1.2, dated on September 28th, 2011. b. Validation Report for CDM project “CATALYTIC N2O DESTRUCTION PROJECT AT THE NEW NITRIC ACID PLANT PANNA 4 OF ENAEX S.A.” (Report No: 8000398029 – 11/370) issued by TÜV Nord, dated on 29/11/2011 c. Previous Verification Report, specially the last one d. Previous Monitoring Reports e. Monitoring Report version 1 dated on 26/07/2013 (published version) f. Monitoring Report version 2 dated on 26/08/2013 (final version) 	Various See the left column.	PDD, Validation Report, Monitoring Reports, Verification Reports
2	UNFCCC IPCC	<u>References and requirements at UNFCCC</u> <ul style="list-style-type: none"> a. UNFCCC homepage http://www.unfccc.int including the CDM section http://cdm.unfccc.int/index.html. b. Approved consolidated baseline and monitoring methodology ACM0019 - N2O abatement from nitric acid production, version 01.0.0 c. CDM Project Standard, version 04.0, d. Guidelines for completing the Monitoring Report Form, version 03.2 e. Tool to determine the mass flow of a greenhouse gas in a gaseous stream, version 02.0.0 Annex 11, EB61 f. CDM Glossary 	Various See the left column.	UNFCCC Regulative

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Ref. No.	Author/Editor/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date	Additional Information (Relevance in CDM context)
		g. CDM Validation and Verification Standard Version 04.0		
4	COREMA, CONAMA, ENAEX S.A. Técnicas Reunidas S.A.	<u>Project Implementation, Licenses</u> <ul style="list-style-type: none"> a. Test run Protocol for Panna4 Nitric Acid Plant signed by ENAEX and Tecnicas Reunidas Espindesa 05/11/2011 b. Process Data Sheet of R4501 Ammonia Oxidation Reactor of Panna4 Nitric Acid Plant issued by Tecnicas Reunidas, 01 Process Data and 02 Materials rev. 01 dated on 22/09/2006 c. Resolución Exenta Nº 0121/2006 – permit for the whole complex dated on 29/05/2006 issued by CONAMA d. Data Sheet of AOR Thermocouple TT-45030 A,B,C e. Secondary Catalyst installation report issued by Heraus dated on 30/11/2011 f. Screenshots of the control panel from FoxView (AOR temperature range) g. Commissioning Certificates for TAG's Meters: AT45094 A, AT45094 B, AT45094 C, FT45092, PT45091, PT45095, PT45097, TT45093, TT45096, dated on 13/12/2011 h. Print screen of DeltaV screen dated 19/08/2013 i. "Memorandum – Actual Capacity of Panna IV Nitric Acid Plant" issued by Técnicas Reunidas, S.A. and signed by the Fertilizer Division Manager dated on 01/03/2013 j. Operating Manual – Project Panna 4 "Manual de operacion ProyectoPanna 4" issued by Técnicas Reunidas (UTE TR-ESPINDESA) dated on May 2008 k. Secondary Catalyst System Inspection and Installation Report, performed by Heraeus on 23/07/2012 	Various See the left column.	

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Ref. No.	Author/Editor/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date	Additional Information (Relevance in CDM context)
5	ENAEX S.A.	<u>Procedures and standards</u> <ul style="list-style-type: none"> a. European Standard EN14181 Stationary source emissions - Quality assurance of automated measuring systems dated on July 2004 b. "Responsibilities & Operational Project Structure.pdf" version 1.0 issued by ENAEX dated on February 2012 c. ISO 9001 Certificate for Planta Prillex America Mejillones Enaex S.A. valid until 29/10/2015 d. Procedure DM-MR-CD-027 "Instrumentalist Work procedure", version 1, 03/09/2007 e. Procedure DM-MR-CD-080 "Thermocouple Temperature revision", version 1, 03/08/2007 f. Procedure "Analyzer N2O Concentration Calibration" (Not included in ISO) g. Procedure "Gauge pressure Transmitter Calibration" (Not included in ISO) 	Various See the left column.	QA/QC Procedures
6	Endress +Hauser WIKA INOR INECO	<u>Monitoring Equipment</u> <ul style="list-style-type: none"> a. Email from Elliot Sanchez Product Manager Flow & EMS Endress +Hauser Chile Ltda regarding recommendations of calibration frequency b. Manufacturer's declaration, Document number 5006501 regarding Model TC10 issued by WIKA Alexander Wiegand SE & Co. KG c. Statement from INOR – signed by a Service and Calibration Engineer - regarding stability of Meso-H / Meso HX applications d. Email from Anibal Gonzales from INECO S.A. regarding recommendations of calibration frequency of PT-45091, TT-45093 and PT-45095. e. Delta V Print Screen – Version number 11 f. Statement from INECO dated on May 2012 regarding the hourly average calculation in the Delta-V system g. Statement from INECO dated on May 2012 regarding recommended calibration frequency of 	Various See the left column.	Calibration Requirements Manufacturer

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Ref. No.	Author/Editor/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date	Additional Information (Relevance in CDM context)
		pressure model 2051C and temperature model 3144P transmitters h. Rosemount 2051 Reference Manual 00809-0100-4101, Rev AA dated on July 2008 i. Rosemount 2051 Reference Manual 00809-0200-4101, Rev AA dated on July 2008		
7	Various See the right column.	<p><u>Calibration</u></p> <p>a. FT 45026 and AT45026 Coriolis Flow and density calibration certificate issued by Endress+Hauser Flowtec dated on 09/11/2011</p> <p>b. AT-45094 and FT-45092 : QAL2 report issued by AIRTEC Date of test 14.12-16.12.2011. Measured objects: FT 45092 (tail gas volume), AT-45094 (N2O concentration), Moisture content, TT 45093 (Tail gas temperature), PT 45091 (Static pressure), PT-45095 (Atmospheric pressure) AT-45094: QAL2 report issued by AIRTEC Date of test 04.06-06.06.2012. Measured objects: AT-45094 (N2O concentration),</p> <p>c. TT 45093: Serial number 706088 Temperature Transmitter Calibration Certificate issued by CIDE USACH dated on 16/11/2011</p> <p>d. TT-45030 Thermometers:</p> <p>I. A: for serial number 1102RY6V: WIKA Calibration Certificate 00795814 dated on 26/10/2011, and Calibration protocol TE – 45030 A dated on 29/08/2012. for serial number 1104NC5G: WIKA Calibration Certificate 01065318 dated on 07/12/2012</p> <p>II. B: for serial number 1102RY6P: Calibration protocol TE – 45030 B dated on 22/07/2012. for serial number 1104NC5H: WIKA Calibration Certificate 01065319 dated on 07/12/2012</p>	Various See the left column.	Calibration evidences

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Ref. No.	Author/Editor/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date	Additional Information (Relevance in CDM context)
		<p>III. C: for serial number 1102RY6Q: Calibration protocol TE – 45030 C dated on 31/08/2012 for serial number 1104N0ON: WIKA Calibration Certificate 01063085 dated on 07/12/2012</p> <p>e. TT-45050 - Certificate issued by ENAEX for HNO3 Temperature Transmitter (Manufacturer: Inor; Model: Meso-H) Serial Number N0809.842183/VO336261 dated on 30/11/2011</p> <p>f. PT-45091 , Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 07/09/2012 Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 10/11/2012 Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 08/12/2012 Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 09/01/2013 Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 08/03/2013</p> <p>g. PT-45095 Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 07/09/2012 Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 10/11/2012 Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 10/12/2012 Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 09/01/2013 Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 08/03/2013</p> <p>h. Calibration Certificate issued for primary devices used to calibrate PT-45091 and PT-45095. Calibration certificates SMF-17105, SMF-17107, SMF-17136, AME-12851, AME-12852, AME-12862 and AME 12864 all issued by CESMEC.</p>		
8	ENAEX S.A.	<u>Other Regular Maintenance other than Calibration</u>	Various	

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Ref. No.	Author/Editor/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date	Additional Information (Relevance in CDM context)
	AIRTEC EMERSON	<ul style="list-style-type: none"> a. Shewhart Control Chart, excel file with graphs of span and zero calibration values of N2O analyser for this monitoring period b. AT45094: QAL1 certificate MLT1 MLT2 of NGA Series issued by TÜV Rheinland Group dated on 16/02/1999 c. AST Report (12-200_AST report 2012- Panna 4_ENAEX_Rev0 (2).pdf), date of test 24 – 25/09/2012 issued by Airtec. 	See the left column.	
9	ENAEX S.A.	<u>Data Measured and Recorded</u> <ul style="list-style-type: none"> a. Delta V csv and mdi files (daily and monthly) for the monitoring period. b. HNO3 density and temperature 1-second data for this monitoring period exported from DCS to Excel file c. HNO3 mass flow and concentration hourly data for this monitoring period exported from Delta V to Excel file 		
10	ENAEX S.A.	<u>Calculation Spreadsheet and Tool</u> <ul style="list-style-type: none"> a. Spreadsheet of Calculation of Emission Reductions “MP 4_PANNA 4 (5393)_UNFCCC SUMMARY_v1 (26-07-13)_confidential.xlsx” version 1 dated on 15/07/2013 b. Spreadsheet of Calculation of Emission Reductions “MP 4_PANNA 4 (5393)_UNFCCC SUMMARY_v2 (29-08-13)_confidential.xlsx” version 2 dated on 29/08/2013 	Various See the left column	
11	ENAEX S.A.	<u>Special Events</u> <ul style="list-style-type: none"> a. DCS History View of AOR Temperature Measurement Device TAG TT45030A for 26/12/2012 b. Shift Protocol for 30/10/2012, 26/12/2012 and 23/02/2013 	Various See the left column.	
12	ENAEX S.A.	<u>Cross-Checking LogBooks Checklists</u>	Various	

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Ref. No.	Author/Edit or/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date	Additional Information (Relevance in CDM context)																
		a. Weekly Checklist of Panna4 CDM Project instruments for this monitoring period. b. Production Data “Listado de Producciones Diarias Planta Prillex América” c. Raw data Check performed by ENAEX (Cross check MP4 Raw) d. Daily LogBook for this monitoring period e. Real Time measurements and charts, taken on-site.	See the left column.																	
13	Praxair	<p><u>Other External Data</u></p> <p>a. Analyzer test gas certificates (zero gas, span gas used in this monitoring period) issued by Praxair S.A.</p> <table><tr><th>Cyl No</th><th>Composition</th><th>Filled</th><th>Expired</th></tr><tr><td>CC279098 Installation date: 23/10/2012</td><td>N2O 165 ppm NO 16.6 ppm</td><td>24/04/2012</td><td>27/04/2014</td></tr><tr><td>CC312768 Already installed since the beginning of the monitoring period until 23/10/2012.</td><td>N2O 168 ppm NO 16.7 ppm</td><td>30/11/2011</td><td>30/11/2013</td></tr><tr><td>CC412103 Installation date: 16/08/2012</td><td>N2 99.999%</td><td>15/12/2012</td><td>--</td></tr></table>	Cyl No	Composition	Filled	Expired	CC279098 Installation date: 23/10/2012	N2O 165 ppm NO 16.6 ppm	24/04/2012	27/04/2014	CC312768 Already installed since the beginning of the monitoring period until 23/10/2012.	N2O 168 ppm NO 16.7 ppm	30/11/2011	30/11/2013	CC412103 Installation date: 16/08/2012	N2 99.999%	15/12/2012	--	Various See the left column.	
Cyl No	Composition	Filled	Expired																	
CC279098 Installation date: 23/10/2012	N2O 165 ppm NO 16.6 ppm	24/04/2012	27/04/2014																	
CC312768 Already installed since the beginning of the monitoring period until 23/10/2012.	N2O 168 ppm NO 16.7 ppm	30/11/2011	30/11/2013																	
CC412103 Installation date: 16/08/2012	N2 99.999%	15/12/2012	--																	

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Ref. No.	Author/Editor/ Issuer	Title/Type of Document. Publication place					Issuance and/or submission date	Additional Information (Relevance in CDM context)
		CC99722 Already installed since the beginning of the monitoring period until 16/08/2012.	N2 99.999%	14/03/2012	--			
14	ENAE S.A. Carbon Climate Protection	<u>Trainings</u> <ol style="list-style-type: none"> Signed List of Participants for Gas Analyzer Training (12/01/2012) held by Daniel Rojas Gas Analyser Specialist from INECO S.A. Signed List of Participants for Delta V Training (12-13/01/2012) held by Pablo Saez Delta V Specialist from INECO S.A. Information on internal WebEx Trainings held by Carbon Climate Protection 					Various See the left column.	Personnel trainings

Annex 3

Appointment Certificates



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Hammer, Martin fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	18.12.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		18.12.12	18.12.12	18.12.12	18.12.12	1.2, 4.9, 5.1, 11.1, 12.1

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	18.12.12					
Further countries						
Financial Expertise						
Date	18.12.12					

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	18.12.12
5.1_4.9_11.1_12.1_Chemical process industries	18.12.12

This appointment is valid until 28.02.2014 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0017/002.

Date	Signature
01.03.2013	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Tolcach, Eric Rodolfo fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	21.11.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		21.11.12	21.11.12	21.11.12	21.11.12	13.1

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	21.11.12	21.11.12				
Further countries						
Financial Expertise						
Date						

Qualification in technical areas	
Technical Area	Date
13.1_Waste handling and disposal	21.11.12

This appointment is valid until 28.02.2014 and is bound by internal requirements of the Certification Body "Environment and Energy" of , TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0045/002

Date	Signature
01.03.2013	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Tollio Vanhaz, Dante Luis fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	21.11.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date						4.9, 5.1, 11.1, 12.1

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date		21.11.12				
Further countries						
Financial Expertise						
Date						

Qualification in technical areas	
Technical Area	Date
5.1_4.9_11.1_12.1_Chemical process industries	21.11.12

This appointment is valid until 28.02.2014 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0058/002.

Date	Signature
01.03.2013	

CERTIFICATE OF APPOINTMENT

Mr. Castro, Javier fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	21.11.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		21.11.12	21.11.12	21.11.12	21.11.12	1.2, 5.1, 4.9, 11.1, 12.1, 13.1, 13.2, 15.2

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	21.11.12	21.11.12				
Further countries						
Financial Expertise						
Date	21.11.12					

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	21.11.12
5.1_4.9_11.1_12.1_Chemical process industries	21.11.12
13.1_Waste handling and disposal	21.11.12
13.2_15.2_Animal waste management	21.11.12

This appointment is valid until 28.02.2014 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0009/002.

Date	Signature
01.03.2013	