



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 #05: 19/03/2013 to 31/12/2013

Report No.: 00875HA

01 December 2014

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Date of first issue of this report	12/11/2014
Revision No. of this report	2
Registered PDD (version/date)	Version 1.2 - 28/09/2011
Registration date	30/11/2011
Revised PDD	Version 1.4 - 17/09/2014
Methodology (title; number; version)	N2O abatement from nitric acid production; ACM0019; Version 02.0
Crediting period	19/12/2011 to 18/12/2021(fixed)
Published Monitoring Report (version/date)	Version 1 - 06/06/2014
Final Monitoring Report (version/date)	Version 2 - 05/11/2014
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 Nordic Environment Finance Corporation (valid from 15/09/2014 onwards)
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 revised 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: 135 230 t CO_{2e}

Baseline: 224 885 tCO_{2e}

Project emissions: 89 654 tCO_{2e}

Leakage: 0 tCO_{2e}

Pune, 01/12/2014



Eswar Murty
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)	-	-
Castro, Javier	V, 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
Tausche, Konrad	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 01/07/2014 – 02/07/2014) 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 revised 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 check 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

Outstanding Requests from 4th Verification	<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> <p>PPs shall record which measuring range was used by the analyser.</p>
Summary of project owner response	The N2O outlet concentration is manually recalculated using the QAL2 parameters. All values above 200 ppm are recalculated using the parameters for the range 0 – 2000 ppm and all values below use the parameters from the range 0 – 200 ppm. The range changes from 0 – 2000 ppm to 0 – 200 ppm whenever the N2O concentration falls below 180 ppm. These changes of range will be recorded.

Conclusion	As PPs respond: the changes of range shall be transparently recorded. The FAR 01 remains open.
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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 EB approved a request for post-registration changes (revised PDD version 1.4 dated on 17/09/2014) on 22/10/2014. The revised PDD applies approved methodology ACM0019 version 02.0. The monitoring plan is in accordance with this approved methodology applied by this CDM project activity.

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 revised 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:	$P_{\text{production},y}$
Data unit:	tHNO ₃
Description:	Production of nitric acid in year y
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 revised 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:	<p>Data provided in the raw data sheet and raw data to calculate HNO₃ concentration (IRL 9b) 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.</p> <p>DeltaV Monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.</p> <p>In regard to the hours of missing $P_{\text{production},y}$ measurement data (CAR03) in some hours of 5th September. PPs have applied 0 tHNO₃ (=most conservative for baseline parameters).</p>
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.</p> <p>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_y
Data unit:	h
Description:	Number of hours of operation in year y
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.</p>

Data / Parameter:	$h_{r,y}$
Data unit:	h
Description:	Number of hours (h) in year y where for secondary any N_2O abatement: abatement system was not installed, underperformed or failed
Source of data used:	<p>This parameter is determined by applying Case 2 for the calculation of $h_{r,y}$ defined in the applied methodology. Case 2 is applicable as the project has never applied AM0028 or AM0034.</p> <p>Thus the relevant monitoring parameters for determining $h_{r,y}$ are:</p> <p> $F_{N_2O,tail\ gas,h} \rightarrow$ Monitoring Parameters $V_{t,db}$ $V_{i,t,db}$ $C_{H_2O,t,db,n}$ $P_{NA,h} \rightarrow$ Monitoring Parameter $P_{production,y}$ $EF_{new,y}$ fixed ex ante </p>
Means of verification/Comments:	<p>The verifier has checked the compliance of the calculation applied with the defined equation in the methodology.</p> <p>For the means of verification of the underlying parameters refer to the table of the relevant monitoring parameter.</p>
Cross-check	n/a: For the crosscheck of the underlying parameters please refer to the table of the relevant monitoring parameter.

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 N_2O concentration and the volume flow of</p>

	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 reports (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.
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. The DeltaV monthly reports (.mdi-files) (IRL 9a) were used to verify correct transfer of raw data to the Excel Tool.
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:	The volumetric fraction of N ₂ O is continuously measured by a non-dispersive infrared photometry for N ₂ O 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). 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-tests in accordance with EN14181 are applied to both the N ₂ O 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 reports (IRL 7b) provided as evidence of the calibration work performed. Hence it is confirmed that calibration was not delayed.
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. 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:	The temperature of tail gas is continuously measured by a PT 100 resistance

	<p>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	<p>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 N₂O concentration. The data were found to be plausible.</p>

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 as specified by the applied methodology (i.e. the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream") and according to the requirements of 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 283 and para 284 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:	<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> <p>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).</p>
Cross-check	<p>In order to ensure the integrity of the data, the verification team reviewed the</p>

	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.
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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 kgH ₂ O / m ³ dry gas (= 3,600 mgH ₂ O/m ³ dry gas) and the highest value according to latest QAL2 report (IRL 7b) is 0.0028 kg H ₂ O/m ³ dry gas (= 2,800 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 emission reductions achieved during this monitoring period are less than estimated in PDD. The amount of emission reductions of the final monitoring period is slightly lower compared to the initial amount reported in the published Monitoring Report version 1. This is mainly a result of CAR03.

Ex-ante values from PDD – not monitored parameters

Data / Parameter:	$EF_{new,y}$
Data unit:	kgN ₂ O/tHNO ₃
Description:	Baseline N ₂ O emission factor for nitric acid production in year y (related to 100 per cent pure acid)
Source of data used:	According to PDD and ACM0019 version 02.0.0
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 - Relevant decisions by the CMP
Means of verification/Comments:	The applied value is in accordance with “Standard for application of the global warming potentials to CDM project activities and PoAs for the second commitment period of the Kyoto Protocol (version 01.0)”
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

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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: <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.
Reliable	Information is reliable if the quality of evidence is accurate and credible and able to yield the same results on a repeated basis.
CAR	The DOE shall raise a CAR if one of the following situations occur: (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.
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.

List of Findings - Compilation and Resolutions

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Compilation and Resolutions of CARs, CRs and FARs

Corrective Action Requests by the assessment team		
	Comments and Results	Conclusion and IRL
Issue	The actual version of the MR form is the 3.2, which is valid only until 18.07.2014.	<input checked="" type="checkbox"/> This Finding is closed IRL 1c IRL 1h
Requirement	New release MR form version 4.0 is available and obligatory applicable from 18.07.2014	
Corrective Action Request	<u>Corrective Action Request No.1</u> The MR shall be updated to the latest MR form version in case that the submission is done after 18.07.2014	
Response	The MR form version was changed to version 04.0. The respective documents were provided to the assessment team.	
Assessment Means of verification	The assessment team has reviewed the revised Monitoring report (IRL 1h). This version is based on the MR form version 04.0.	
Changes in the monitoring report or supporting annexes	The MR form version 04.0 has been applied.	
	Comments and Results	Conclusion and IRL
Issue	<u>Completeness and transparency</u> <ul style="list-style-type: none"> The MR includes references only to the registered PDD without mention to the revised PDD Not all parameters that differ between the registered PDD and the revised PDD are included in the MR (e.g. hy) Information regarding date of installation of replaced equipments is not available in the MR. The AST has been performed almost one month after the planned date (one year after the last AST). It is clear from the e-mail communication with the certification company that this delay occurs due to the not availability of the auditors, hence it was outside the 	<input checked="" type="checkbox"/> This Finding is closed IRL 1c IRL 1h IRL 11b

List of Findings - Compilation and Resolutions

Project Title:

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Corrective Action Requests by the assessment team		
	control of ENAEX.	
Requirement	The principles presented in the CDM Project standard shall be fulfilled	
Corrective Action Request	<p><u>Corrective Action Request No.2</u></p> <ul style="list-style-type: none"> • The MR shall address also the revised PDD. • The information regarding dates of installation of different monitoring equipment shall be presented in the MR • All parameters that differ between the registered PDD and the revised PDD shall be presented in the MR (e.g. Number of hours of operation in year y) • The MR shall include information regarding the delay on the AST. 	
Response	<ul style="list-style-type: none"> • The MR includes now also the revised PDD. • The information regarding dates of installation of different monitoring equipment is shown now in the MR, according to the period (e.g. 2013). • All parameters that differ between the registered and revised PDD are shown now in the MR, h_y (number of hours of operation in year y) was included. • Explanation regarding the delay of AST was added to the MR. 	
Assessment Means of verification	<p>The assessment team has reviewed revised MR (IRL 1h) with special focus on the description in Chapter 2.3 “Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline”. The description was found in compliance with the changes in the revised PDD (IRL 1c) and the MR complies completely with the revised Monitoring Plan included in the revised PDD (IRL 1c) including all parameters that differ between the registered and revised PDD. Moreover the revised MR includes an explanation regarding the delay of AST.</p> <p>The assessment team has reviewed the supporting documents (IRL 11b), which proof a replacement of thermocouples TT-45030 A-C and explain the different serial numbers reported in the MR and found onsite.</p>	
Changes in the monitoring report or supporting annexes	The MR has been adapted to the revised PDD.	

List of Findings - Compilation and Resolutions

Project Title:

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Corrective Action Requests by the assessment team		
	Comments and Results	Conclusion and IRL
Issue	<p><u>Data correctness:</u></p> <ul style="list-style-type: none"> During two hours in 23.03.2013 the temperature of at least two thermocouples are outside the operational range, nevertheless these hours were considered as normal operational hours. According to the procedures these hours shall be considered as not operational. The change of range of the analyzer between 0-200 to 0-2000 is performed based on the following rule: from 0-200 to 0-2000 change when the punctual measurement is above 200 ppm. From 0-2000 to 0-200 change when the punctual value is below 180 ppm. This approach has not been correctly implemented in the calculation files. The data available in Delta V shows the correct hour of change of range. The equipment measuring the nitric acid production did not record any value during several hours in 5th of September. For these cases the system automatically takes the last measured value for this period, hence this data cannot be used. 	<p>☑</p> <p>This Finding is closed</p> <p>IRL 10b</p> <p>IRL 11a</p>
Requirement	Internal procedures to define when the plant is in operation	
Corrective Action Request	<p><u>Corrective Action Request No.3</u></p> <p>The affected data shall be corrected to address these issues.</p>	
Response	<ul style="list-style-type: none"> The data of two hours on 23.03.2013 is considered as not valid for the calculation. In those hours, the data was corrected. Hours in which the range changes were correctly marked in the UNFCCC Summary. During the on-site visit the hours were confirmed in which the change is performed. The data of nitric acid production was not recorded in the Foxboro System on September 5th from 02:00 to 10:00. Nevertheless, the DeltaV system reported values, which correspond to the default value. In these hours the minimum value of nitric acid flow was applied. 	
Assessment Means of verification	The assessment team has reviewed the revised Excel calculation tool (IRL 10b) with special focus on hours 11:00 and 12:00 on 23 rd of March 2013. For both hours the plant was set to be out of operation (i.e. $P_{\text{production},y} = 0$ and $h_y = 0$) which is conservative.	

List of Findings - Compilation and Resolutions

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Corrective Action Requests by the assessment team		
	<p>The assessment team has reviewed the revised Excel calculation tool (IRL 10b) with special focus on the hours identified during onsite visit where the analyser switched the ranges (IRL 11a). The QAL2 factors were found to be correctly implemented.</p> <p>The assessment team has reviewed the revised Excel calculation tool (IRL 10b) with special focus on nitric acid data on 5th of September. From hour 02:00 to 10:00 the minimum (i.e. 0 tHNO₃ which is conservative as the nitric acid production hour is a baseline parameter) was applied. This temporary deviation does not need a prior approval according to the appendix 1 of the Project Standard.</p>	
Changes in the monitoring report or supporting annexes	The data correction resulted in Changes in the Excel Calculation Tool and a slight reduction of emission reductions.	

Clarification Requests by the assessment team		
	Comments and Results	Conclusion and IRL
Issue	none	n/a
Requirement	n/a	
Clarification Request	<u>Clarification Request No. 1</u>	
	none	
Response	n/a	
Assessment Means of verification	n/a	
Changes in the monitoring report or supporting annexes	n/a	

List of Findings - Compilation and Resolutions

Project Title:

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Forward Action Requests by the assessment team from previous period		
	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>	FAR 01 remains open
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 outlet concentration is manually recalculated using the QAL2 parameters. All values above 200 ppm are recalculated using the parameters for the range 0 – 2000 ppm and all values below use the parameters from the range 0 – 200 ppm. The range changes from 0 – 2000 ppm to 0 – 200 ppm whenever the N ₂ O concentration falls below 180 ppm. These changes of range will be recorded.	
Means of verification	As PPs respond: the changes of range shall be transparently recorded. The FAR 01 remains open.	
Response	<i>Required for verification #06.</i>	
Means of verification	<i>Required for verification #06.</i>	
Any resulting changes in the monitoring report or supporting annexes		

List of Findings - Compilation and Resolutions

Project Title:


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Forward Action Requests by the assessment team from this period		
	Comments and Results	
Issue	During the on-site visit it has been observed that the value recorded for the production of nitric acid is high, while the plant is not in operation. The technical reason of this failure shall be analysed for the next monitoring period. This issue has been observed only since the last stop of plant, hence has no effect on the actual monitoring period.	
Requirement	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.	
Forward Action Request	<u>Forward Action Request No. 2</u> PPs shall clarify the issue during next verification #06.	
Response	<i>Required for verification #06.</i>	
Means of verification	<i>Required for verification #06.</i>	
Any resulting changes in the monitoring report or supporting annexes		

Annex 2

Information Reference List

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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
Claudia Bravo	Process Engineer	ENAEX S.A.
Carlos Araneda	Process Engineer	ENAEX S.A.
Josefina Diaz	CDM Team Support	ENAEX S.A.

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


Name	Function	Company
Sonja Bichler	Project Manager	Carbon Climate Protection GmbH

Information Reference List	Verification of CDM Project	Page 2 of 9	
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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. Revised 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 1.4, dated on September 17th, 2014 d. Validation Opinion of post registration change at an existing CDM-project: Catalytic N2O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A. (UNFCCC registration ref. No. 5393) report No. 00875HA issued by TÜV SÜV dated on 22/09/2014 e. Previous Verification Report, specially the last one f. Previous Monitoring Reports g. Monitoring Report version 1 dated on 06/06/2014 (published version) h. Monitoring Report version 2 dated on 05/11/2014 (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 02.0. 	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)
		<ul style="list-style-type: none"> c. CDM Project Standard, version 07.0, d. Monitoring Report Form, version 04.0 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 g. CDM Validation and Verification Standard Version 07.0 		
4	COREMA, CONAMA, ENAEX S.A. Técnicas Reunidas S.A.	<p><u>Project Implementation, Licenses</u></p> <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 N° 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 	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)
		<p>Reunidas, S.A. and signed by the Fertilizer Division Manager dated on 01/03/2013</p> <p>j. Operating Manual – Project Panna 4 “Manual de operacion ProyectoPanna 4” issued by Técnicas Reunidas (UTE TR-ESPINDESA) dated on May 2008</p> <p>k. Secondary Catalyst System Inspection and Installation Report, performed by Heraeus on 23/07/2012</p>		
5	ENAE S.A.	<p><u>Procedures and standards</u></p> <p>a. European Standard EN14181 Stationary source emissions - Quality assurance of automated measuring systems dated on July 2004</p> <p>b. “Responsibilities & Operational Project Structure.pdf” version 1.0 issued by ENAE S.A. dated on February 2012</p> <p>c. ISO 9001 Certificate for Planta Prillex America Mejillones Enaex S.A. valid until 29/10/2015</p> <p>d. Procedure DM-MR-CD-027 “Instrumentalist Work procedure”, version 1, 03/09/2007</p> <p>e. Procedure DM-MR-CD-080 “Thermocouple Temperature revision”, version 1, 03/08/2007</p> <p>f. Procedure “Analyzer N2O Concentration Calibration” (Not included in ISO)</p> <p>g. Procedure “Gauge pressure Transmitter Calibration” (Not included in ISO)</p>	Various See the left column.	QA/QC Procedures
6	Endress +Hauser WIKA INOR INECO	<p><u>Monitoring Equipment</u></p> <p>a. Email from Elliot Sanchez Product Manager Flow & EMS Endress +Hauser Chile Ltda regarding recommendations of calibration frequency</p> <p>b. Manufacturer’s declaration, Document number 5006501 regarding Model TC10 issued by WIKA Alexander Wiegand SE & Co. KG</p> <p>c. Statement from INOR – signed by a Service and Calibration Engineer - regarding stability of Meso-H / Meso HX applications</p>	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)
		<ul style="list-style-type: none"> 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 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> <ul style="list-style-type: none"> a. FT 45026 and AT45026 Coriolis Flow and density calibration certificate issued by Endress+Hauser Flowtec dated on 09/11/2011 and density calibration certificate issued by BY H&D Fitzgerald Ltd dated of issue 14/10/2013 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), AT-45094 and FT-45092: QAL2 report issued by AIRTEC Date of test 23.10-25.10.2013. 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) c. TT 45093: Serial number 706088 Temperature Transmitter Calibration Certificate issued by 	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>ENAEX S.A. dated on 22/08/2012</p> <p>d. TT-45030 Thermometers:</p> <p>I. A: for serial number 1102RY6V: Calibration protocol TE – 45030 A dated on 29/08/2012.</p> <p>II. B: for serial number 1102RY6P: Calibration protocol TE – 45030 B dated on 22/07/2012.</p> <p>III. C: for serial number 1102RY6Q: Calibration protocol TE – 45030 C dated on 31/08/2012</p> <p>e. TT-45050 - Certificate issued by ENAEX for HNO3 Temperature Transmitter (Manufacturer: Inor; Model: Meso-H) Serial Number N0809.842183/VO336261dated on 24/07/2012</p> <p>f. PT-45091 ,</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 08/03/2013</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 04/04/2013</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 04/06/2013</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 16/07/2013</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 10/08/2013</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 04/09/2013</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 02/10/2013</p> <p>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 04/11/2013</p>		

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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>Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 09/12/2013</p> <p>g. PT-45095</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 08/03/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 04/04/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 04/06/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 16/07/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 10/08/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 04/09/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 02/10/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 04/11/2013</p> <p>Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 09/12/2013</p>		
8	ENAEX S.A. AIRTEC EMERSON	<p><u>Other Regular Maintenance other than Calibration</u></p> <p>a. Shewhart Control Chart, excel file with graphs of span and zero calibration values of N2O analyser for this monitoring period</p> <p>b. AT45094: QAL1 certificate MLT1 MLT2 of NGA Series issued by TÜV Rheinland Group dated on 16/02/1999</p> <p>c. AST Report (12-200_AST report 2012- Panna 4_ENAEX_Rev0 (2).pdf), date of test 24 – 25/09/2012 issued by Airtec.</p>	Various See the left column.	
9	ENAEX S.A.	<p><u>Data Measured and Recorded</u></p> <p>a. Delta V csv and mdi files (daily and monthly) for the monitoring period.</p> <p>b. HNO3 raw data hourly data for this monitoring period exported from DCS to Excel file</p>		
10	ENAEX S.A.	<u>Calculation Spreadsheet and Tool</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. Spreadsheet of Calculation of Emission Reductions “MP 5_PANNA 4 (5393)_UNFCCC SUMMARY_v1 (06-06-14)_confidential..xlsx” version 1 dated on 06/06/2014 b. Spreadsheet of Calculation of Emission Reductions “MP 5_PANNA 4 (5393)_UNFCCC SUMMARY_v2_Confidential.xlsx “version 2 dated on 05/11/2014	See the left column													
11	ENAEX S.A.	<u>Special Events</u> a. Process History View - Charts for hours of analyzer switch - taken during onsite audit b. Work Instruction to Replace instruments TT-45030A-C dated on 03/03/2014	Various See the left column.													
12	ENAEX S.A	<u>Cross-Checking LogBooks Checklists</u> 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 MP5 Raw) d. Real Time measurements and charts, taken on-site.	Various See the left column.													
13	Praxair	<u>Other External Data</u> a. Analyzer test gas certificates (zero gas, span gas used in this monitoring period) issued by Praxair S.A. <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>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	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													
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)
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

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	ISO-14064-1: 2006	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TA (s)	1.2, 4.9, 5.1, 5.2, 11.1, 12.1.					


Country Expertise						
Region	1	2	3	4	5	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Further countries						

Technical Area
1.2_ Renewables
5.1_ 4.9_ 12.1_ Chemical process industries
5.2_ Caprolactam, nitric acid, adipic acid
11.1_ Emissions of fluorinated gases

This appointment is valid until 31.12.2014 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-0017/004.

Date	Signature
01/06/2014	

IS-CMS-CB-POG-01/05, version 03

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South Asia

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	ISO-14064-1: 2006	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TA (s)	1.2, 5.1, 4.9, 11.1, 12.1, 13.1, 13.2.					

Country Expertise						
Region	1	2	3	4	5	Other
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Further countries						

Technical Area
1.2_Renewables
5.1_4.9_12.1_Chemical process industries
11.1_Emissions of fluorinated gases
13.1_Waste handling and disposal
13.2_Animal waste management

This appointment is valid until 31.12.2014 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-0009/004.

Date	Signature
01/06/2014	

IS-CMS-CB-POG-01/05, version 03

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CERTIFICATE OF APPOINTMENT

Mr. Tausche, Konrad 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	ISO-14064-1: 2006	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TA (s)	1.1, 4.9, 4.10, 5.1, 11.1, 12.1, 13.1.					

Country Expertise						
Region	1	2	3	4	5	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Further countries						

Technical Area
1.1_4.10_Thermal energy generation.....
5.1_4.9_12.1_Chemical process industries
11.1_Emission of fluorinated gases
13.1_Waste handling and disposal

This appointment is valid until 31.12.2014 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-0042/004.

Date	Signature
01/06/2014	