



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 #02: 01/02/2012 to 30/06/2012

Report No. 600500886

22 March 2013

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Date of first issue of this report	13/09/2012
Revision No. of this report	03
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 0 - 14/08/2012
Final Monitoring Report (version/date)	Version 1 - 05/10/2012
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 (contractor)	Enaex S.A.
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: 70 427 t CO_{2e}

Baseline:	173 653	tCO _{2e}
Project emissions:	103 226	tCO _{2e}
Leakage:	0	tCO _{2e}

Pune, 22/03/2013



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
FSR	Feasibility Study Report
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
MTPD	Metric tons per day
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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Annex 1: List of Findings

Annex 2: Information Reference List

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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)	-	-
Saldias Kiefer, Lester	V	<input checked="" type="checkbox"/>	-	<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 (s):

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 (10/09/2012 - 11/09/2012)) 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 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 is closed A series of charts extracted from DeltaV system (IRL 11f) was shown to the audit team displaying the different span and zero gas performed on the QAL3 analysis during 07-23/03/2012. The system was automatized on March 16 th , as could be verified by the INECO Report dated on March 17 th (IRL 11e).

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.

The difference in the values does not lead to a substantial increment of the ER in this period or 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. A Macro for automatic data transfer is currently under preparation.

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 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 of as 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	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 be in a reasonable range. In addition the calculation of HNO ₃ concentration (based on density and temperature of HNO ₃ produced) has been crosschecked with empirical values of HNO ₃ temperature, density and concentration.

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 TT45030A – C) measuring the temperature at the same time. The value of the instrument with the TAG number TT45030A was selected as main signal for monitoring the operation temperature; TT45030B and TT45030C are used as back-up signals in case TT45030A 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 during 27/06/2012 00:00 and 27/06/2012 11:00 where the instrument TT 45030A was malfunctioning due to a wire connection problem (corrosion). Back-up TT45030B have been used until the connection of the main instrument has been repaired. This is in accordance with the approved monitoring plan in PDD. The maintenance works performed for this event were found to be duly reported in a maintenance report (IRL 11a) which was reviewed by the verification team.</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:	The total gas volume is continuously measured by a DURAG DFL 100 DS 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>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. The QAL2 report (IRL 7b) 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, to see the overall integrity of oxidation temperature. The data were found to be plausible.</p>

Data / Parameter:	$V_{i,t,db}$
Data unit:	m ³ gas /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> <p>Due to a broken catchment basket a significant amount of secondary catalyst got lost during this monitoring period (after plant shutdown on 15-16/02/2012). Photos of the secondary catalyst bed (IRL 11b) (taken on 25/07/2012 when the catchment was repaired and secondary catalyst refilled) were reviewed by the verification team. As a consequence of the secondary catalyst lost, the N₂O abatement efficiency decreased significantly and the N₂O concentration in the stack gas increased. PPs observed that the switch to the upper measurement range (0-2000ppm) at the N₂O analyser did not work. Hence the values taken from 17/02/2012 03:00 to 07/03/2012 15:00 were not considered as reliable and therefore</p>

	conservative default value according to the procedure of applied methodology has been used. Since 07/03/2012 15:00 the problem with upper measurement range of the analyser was fixed as verified with a service protocol from Emerson and a service report from INECO (IRL 11c and IRL 11d). Another effect of the increased N ₂ O concentration was that the QAL2 parameters for N ₂ O analyser obtained during the QAL2 performed in December 2011 got invalid (cf. Chapter 6.5 "Calibration function of the AMS and its validity" of EN14181 (IRL 5a). Hence PPs repeated the QAL2 for the N ₂ O analyser timely in accordance with EN14181 and applied the new QAL2 parameters properly since 07/03/2012 as verified with the formulas applied in the Excel calculation tool (IRL 10a).
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. The monthly calibration of the instruments was delayed two times during this monitoring period.</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>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 10a), (d) all measured hourly values taken during the period between the scheduled date of calibration and the actual date of calibration (IRL 10a, IRL 7f and IRL 7g).</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 10a).</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:	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 (QAL2 Report).
Means of verification/Comments:	<p>Option A of the tool can be applied, as the moisture content is less than 0.05 kg H₂O/m³ dry gas. The highest measured value according to QAL2 report is 0.0024 kg H₂O/m³ dry gas (= 2,400 mg H₂O/m³ dry gas).</p>
Cross-check	<p>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></p> <p>The moisture content measured during QAL2 by third party is in compliance with the observations of validating DOE.</p>

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.

Ex-ante values from PDD – not monitored parameters

Data / Parameter:	$EF_{\text{default},y}$
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_{N_2O}
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

2.6 Request For Issuance Incomplete for Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A. (5393)

DOE shall provide further evidence that the project activity is operating as per registered PDD, in particular the nitric acid production process, based on submitted documentation, it appears that the facility have had overproduction of nitric acid during the monitoring period.

The nitric acid plant, which is in operation since November 2010, has a designed capacity (= nameplate capacity) of 925 mtpd HNO₃ (100%). This has been confirmed by the plant supplier Técnicas Reunidas (IRL 4i). Further, it has been confirmed by the plant supplier that into the plant design, reserves were necessarily incorporated. Such design margins amount in the case of Panna 4 due to the large capacity to 10-20%. 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.

Additionally the assessment team reviewed the operating manual of the Panna 4 Nitric Acid Plant (IRL 4j) which shows also a nominal capacity of 925 mtpd HNO₃ (100%).

As the supplier explicitly confirms both, the design capacity of 925 mtpd and the design margin of 10-20%, the assessment team do not see any inconsistency between the information in PDD and the actual operation of the plant and the project activity is operated as per the registered PDD.

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.

Page 1 of 4



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 / IRL
Issue	The calibration date(s) for parameter $v_{i,t,db}$ (Volumetric fraction of greenhouse gas i in a time interval t on a dry basis) does not cover the whole monitoring period.	Finding closed. IRL 1f IRL 7b
Requirement	EB 66 Report Annex 20 (Guidelines for completing the monitoring report form): For Monitoring equipment: provide information on type, accuracy class, serial number, calibration frequency, date of last calibration and validity. Measurement/Reading/Recording is also required by the form.	
Corrective Action Request	<u>Corrective Action Request No.1</u> All calibration dates relevant for this monitoring period shall be reported in the MR.	
Response	The date of penultimate calibration of AT-45094C for parameter $v_{i,t,db}$ (Volumetric fraction of greenhouse gas i in a time interval t on a dry basis) was included in the MR. The cor-	

List of Findings - Compilation and Resolutions

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

Page 2 of 4



Corrective Action Requests by the assessment team		
	rected MR was provided to the assessment team.	
Assessment Means of verification	The assessment team reviewed the revised MR (IRL 1f) with special focus on the calibration date(s) for parameter $v_{i,t,db}$ (Volumetric fraction of greenhouse gas i in a time interval t on a dry basis). Thus the verifier can confirm that the dates reported covers the whole monitoring period. The date is consistent with the QAL 2 report (IRL 7b).	
Changes in the monitoring report or supporting annexes	The date of QAL2 in December 2011 has been included.	
Issue	The Excel File includes hourly values for the whole monitoring period. However the date/hour of each last hour of a day is not consistent with the date/hour of the raw database (DeltaV). e.g. the last hour of 30/06/2012 in the Excel File is 30/06/2012 00:00 while the same data in the raw database is found under 01/07/2012 00:00.	Finding closed. 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	
Corrective Action Request	<u>Corrective Action Request No.2</u> The hours in the Excel File shall be consecutively listed and the date/hour should be consistent with the raw database.	
Response	The dates/hours in the Excel File were made consistent and the UNFCCC Summary file 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 consistency of date/hours with raw data database. The date hours were found to be consecutively reported and consistent with raw database.	
Changes in the monitoring report or supporting annexes	Some date/hours in the Excel Calculation Tool (IRL 10b).	

List of Findings - Compilation and Resolutions

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

Page 3 of 4



South Asia

Clarification Requests by the assessment team		
	Comments and Results	Conclusion / IRL
Issue	Request For Issuance Incomplete for Catalytic N ₂ O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A. (5393)	Finding closed. IRL 1a IRL 4i IRL 4j
Requirement	CDM-EB65-A05-STAN: Clean development mechanism project standard 187. Project participants shall implement the registered CDM project activity in accordance with the description in the registered PDD including all physical features. 188. Project participants shall operate the registered CDM project activity in accordance with the description in the registered PDD.	
Clarification Request	<u>Clarification Request No. 1</u> PP shall provide further evidence that the project activity is operating as per registered PDD, in particular the nitric acid production process, based on submitted documentation, it appears that the facility have had overproduction of nitric acid during the monitoring period.	
Response	The project activity is operated as per the registered PDD. The nitric acid plant, which is in operation since November 2010, has a designed capacity (= nameplate capacity) of 925 mtpd HNO ₃ (100%). This has been confirmed by the plant supplier. Further, it has been confirmed by the plant supplier that into the plant design reserves were necessarily incorporated. Such design margins amount in the case of Panna IV due to the large capacity to 10-20%. 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. The technical statement by the plant supplier has been submitted to the verification team.	
Assessment Means of verification	The assessment team has reviewed the PP's clarification together with the supporting document - the memorandum from the plant supplier Técnicas Reunidas (IRL 4i). The clarification of PPs above is found to be confirmed with the statement of plant supplier. Additionally the assessment team reviewed the operating manual of the Panna 4 Nitric Acid Plant (IRL 4j) which shows a nominal capacity of 925 mtpd HNO ₃ (100%). As the supplier explicitly confirms both, the design capacity of 925 mtpd and the design margin of 10-20%, the assessment team do not see any inconsistency between the information in PDD and the actual operation of the plant.	
Changes in the monitoring report or supporting annexes	N/A	

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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South Asia

Forward Action Requests by the assessment team		
	Comments and Results	
Issue	none	n.a.
Requirement	n.a.	
Forward Action Request	<u>Forward Action Request No. 1</u> none	
Response	n.a.	
Means of verification	n.a.	
Any resulting changes in the monitoring report or supporting annexes	n.a.	

Annex 2

Information Reference List


Information Reference List	Verification of CDM Project	Page 1 of 8	 South Asia
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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
Ricardo Camus R.	CDM Operations Leader	ENAEX S.A.
Hans-Jürgen Salmhofer	CDM Project Engineer	Carbon Climate Protection
Carlos Araneda	Process Engineer	ENAEX S.A.
Claudia Bravo	Process Engineer	ENAEX S.A.


Other Interviewed Persons (not during onsite assessment): none

Information Reference List	Verification of CDM Project	Page 2 of 8	 South Asia
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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	ENAE 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 ENAE 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 0 dated on 14/08/2012 (GSP version) f. Monitoring Report version 1 dated on 05/10/2012 (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 01.0, EB65 Annex5 d. Guidelines for completing the Monitoring Report Form, version 02.0, EB 66Annex 20 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 version 05 g. CDM Validation and Verification Standard 	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)
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 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 dated on 27/01/2012 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 10/09/2012. 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 	Various See the left column.	
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 	Various See the left column.	QA/QC Procedures

Information Reference List	Verification of CDM Project	Page 4 of 8	 South Asia
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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>February 2012</p> <p>c. ISO 9001 Certificate for Planta Prillex America Mejillones Enaex S.A. valid until 29/10/2012</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>		
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> <p>d. Email from Anibal Gonzales from INECO S.A. regarding recommendations of calibration frequency of PT-45091, TT-45093 and PT-45095.</p> <p>e. Delta V Print Screen – Version number</p> <p>f. Statement from INECO dated on May 2012 regarding the hourly average calculation in the Delta-V system</p> <p>g. Statement from INECO dated on May 2012 regarding recommended calibration frequency of pressure model 2051C and temperature model 3144P transmitters</p> <p>h. Rosemount 2051 Reference Manual 00809-0100-4101, Rev AA dated on July 2008</p> <p>i. Rosemount 2051 Reference Manual 00809-0200-4101, Rev AA dated on July 2008</p>	Various See the left column.	Calibration Requirements Manufacturer
7	Various See the right	<p><u>Calibration</u></p> <p>a. FT 45026 and AT45026 Coriolis Flow and density calibration certificate issued by</p>	Various See the left	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)
	column.	<p>Endress+Hauser Flowtec dated on 09/11/2011</p> <p>b. AT45094 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) AT45094: 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-45030A: Acceptance Test Certificate 3.1 according to EN10204 for TC10 Serial number 3F0AF4X dated on 13/09/2010</p> <p>e. TT-45050 - Certificate issued by ENAEX for HNO3 Temperature Transmitter (Manufacturer: Inor; Model: Meso-H) Serial Number N0809.842183/VO336261dated on 30/11/2011</p> <p>f. PT-45091 Calibration Certificate for serial No. 58154, issued by CESMEC S.A., dated on 13/01/2012, Calibration Protocol for TAG PT-45091, issued by ENAEX S.A., dated on 15/02/2012 Calibration Certificate for TAG PT-45091, issued by CESMEC S.A., dated on 14/03/2012 Calibration Protocol for serial No. 58154, issued by ENAEX S.A., dated on 16/04/2012 Calibration Protocol for serial No. 58154, issued by ENAEX S.A., dated on 15/05/2012 Calibration Protocol for serial No. 58154, issued by ENAEX S.A., dated on 10/06/2012</p> <p>g. PT-45095 Calibration Certificate for serial No. 58157, issued by CESMEC S.A., dated on 13/01/2012, Calibration Protocol for TAG PT-45095, issued by ENAEX S.A., dated on 15/02/2012 Calibration Certificate for TAG PT-45095, issued by CESMEC S.A., dated on 14/03/2012 Calibration Protocol for serial No. 58157, issued by ENAEX S.A., dated on 16/04/2012</p>	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>Calibration Protocol for serial No. 58157, issued by ENAEX S.A., dated on 15/05/2012</p> <p>Calibration protocol for serial No. 58157, issued by ENAEX S.A., dated on 10/06/2012</p> <p>h. Calibration Certificate issued for primary devices used to calibrate PT-45091 and PT-45095. Calibration certificate number 2011-0861 dated on 17/02/2011 and calibration certificate Nr. 2011-0874 both issued by Desarrollo de Tecnologias y sistemas (DTS)</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 on 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>	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 density and temperature 1-second data for this monitoring period exported from DCS to Excel file</p> <p>c. HNO₃ mass flow and concentration hourly data this monitoring period exported from Delta V to Excel file</p>	27/08/2012 05/10/2011 11/10/2011	
10	ENAEX S.A.	<p><u>Calculation Spreadsheet and Tool</u></p> <p>a. Spreadsheet of Calculation of Emission Reductions "MP 2_PANNA 4 (5393)_UNFCCC SUMMARY_v0 17-08-12_Confidential" version 0 dated on 17/08/2012</p> <p>b. Spreadsheet of Calculation of Emission Reductions "MP 2_PANNA 4 (5393)_UNFCCC SUMMARY_v1 05-10-12_Confidential" version 1 dated on 05/10/2012</p>	Various See the left column	
11	ENAEX S.A.	<u>Special Events</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)												
		<div>a. "Informe Turno Dia" dated 27/06/2012</div> <div>b. Photos from secondary catalyst taken on 25/07/2012</div> <div>c. Task Control Minute issued by Emerson checking the functioning of the Analyzer, for the period 05-09/03/2012</div> <div>d. INECO Report dated 09/03/2012, informing regarding the modification of the calibration's range of the analyzer</div> <div>e. INECO Report dated 17/03/2012, informing regarding the modification of the calibration's automatic triggering time.</div> <div>f. Print screens from DCS "Process history View" from 07/03/2012 to 23/03/2012</div>	See the left column.													
12	ENAEX S.A	<div><u>Cross-Checking LogBooks Checklists</u></div> <div>a. Weekly Checklist of Panna4 CDM Project instruments for this monitoring period.</div> <div>b. Production Data "Listado de Producciones Diarias Planta Prillex América"</div> <div>c. Raw data Check performed by ENAEX (Cross check MP2 Raw.)</div> <div>d. Daily LogBook for this monitoring period.</div> <div>e. Real Time measurements and charts, taken on-site.</div>	Various See the left column.													
13	Praxair	<div><u>Primary Gauzes, Other External Data</u></div> <div>a. Analyzer test gas certificates (zero gas, span gas used in this monitoring period) issued by Praxair S.A.</div> <table><tr><th>Cyl No</th><th>Composition</th><th>Filled</th><th>Expired</th></tr><tr><td>CC312768</td><td>N2O 168ppm</td><td>30/11/2011</td><td>30/11/2013</td></tr><tr><td>CC330059</td><td>N2 99.999%</td><td>21/12/2010</td><td>--</td></tr></table>	Cyl No	Composition	Filled	Expired	CC312768	N2O 168ppm	30/11/2011	30/11/2013	CC330059	N2 99.999%	21/12/2010	--	Various See the left column.	
Cyl No	Composition	Filled	Expired													
CC312768	N2O 168ppm	30/11/2011	30/11/2013													
CC330059	N2 99.999%	21/12/2010	--													

Information Reference List	Verification of CDM Project	Page 8 of 8	 South Asia
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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



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	

CERTIFICATE OF APPOINTMENT

Mr. Saldias Kiefer, Lester 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			1.2, 13.1

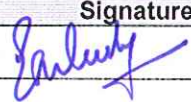
Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	21.11.12	21.11.12				
Further countries						
Financial Expertise						
Date						

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	21.11.12
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-0059/002.

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	



South Asia

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	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	1.1, 4.9, 4.10, 5.1, 11.1, 12.1, 13.1

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

Qualification in technical areas	
Technical Area	Date
1.1_4.10_Thermal energy generation.....	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

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-0042/002

Date	Signature
01.03.2013	