

 <p style="text-align: center;">Verification and certification report form for CDM project activities (Version 03.0)</p>	
Complete this form in accordance with the instructions attached at the end of this form.	
BASIC INFORMATION	
Title and UNFCCC reference number of the project activity	Catalytic N ₂ O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A. 5393
Scale of the project activity	<input checked="" type="checkbox"/> Large-scale <input type="checkbox"/> Small-scale
Version number of the verification and certification report	03.0
Completion date of the verification and certification report	22/05/2020
Monitoring period number and duration of this monitoring period	Monitoring period: 11 th 01/12/2018 - 30/11/2019
Version number of the monitoring report to which this report applies	01.1
Crediting period of the project activity corresponding to this monitoring period	Type: fixed Start date: 19/12/2011 Length: 10 years
Project participants	Enaex S.A. Carbon Climate Protection GmbH
Host Party	Republic of Chile
Applied methodologies and standardized baselines	ACM0019 v2 (N ₂ O Abatement from Nitric Acid Production) No standardized baseline(s) applicable
Mandatory sectoral scopes	5: Chemical industries
Conditional sectoral scopes, if applicable	Not Applicable
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	216,587 tCO ₂ e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	0 tCO ₂ e
Name and UNFCCC reference number of the DOE	ERM Certification and Verification Services E-0016

**Name, position and signature of the approver
of the verification and certification report**



Melanie Eddis, Partner

SECTION A. Executive summary

ERM Certification and Verification Services (ERMCVS) was commissioned by Enaex S.A. (Enaex), to verify and certify the ER reported for the period 01/12/2018 - 30/11/2019 as set out in the monitoring report of the CDM project activity *Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.*, UNFCCC Reference 5393.

Description of CDM project activity:

The project activity consists in the installation and operations of N₂O catalyst inserted below the primary catalyst (NH₃ catalyst) in the ammonia oxidation reactor (secondary N₂O abatement) of PANNA 4 of Enaex located at the Prillex®America Plant at the municipality of Mejillones, Province of Antofagasta, Chile.

Panna 4 was erected in 2010. It produces ammonium nitrate (NH₄NO₃), which is used as a raw material for mining and civil explosives used in the mining and construction industries. The nitric acid is also used as raw material for other explosives (PETN and Nitro-glycerine), also used in the same industries previously mentioned. The operation of the CDM project activity started in December 2011.

Project emissions are monitored continuously to determine the ER for each monitoring period. No leakage is expected to occur in projects under this methodology. Requirements regarding the calibration of specific instruments (measuring N₂O flow and concentration in the gaseous stream) follow the European Standard EN14181. During this monitoring period several operational events (planned or forced shutdowns, safety trips, etc.) occurred. All have been verified and as applicable are discussed in this report (please refer to Appendix 5).

ERM CVS was responsible to provide an independent verification conclusion on the reported greenhouse gas (GHG) ER for the project during the relevant monitoring period. The verification activities included desk review, site visit, close out of open issues, preparation of reports and technical review. This report sets out the methodology and conclusions of the verification process and the ERM CVS Certification Statement. ERM CVS assessed and verified whether the implementation of the project activity and the steps taken to report ER comply with the CDM criteria and relevant guidance provided by the CMP and the CDM Executive Board.

As set out in the CDM modalities and procedures, verification is the periodic independent review and ex post determination by the Designated Operational Entity (DOE) of the monitored reductions in anthropogenic emissions by sources of greenhouse gases (GHGs) that have occurred as a result of a registered CDM project activity during the verification period. Certification is the written assurance by the DOE that, during a specified time period, a project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified. The objective of the verification is to establish whether sufficient evidence exists to confirm, to reasonable assurance:

- Whether the project activity has been implemented and is being operated as per the PDD /03/ and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project activity are in place;
- Whether the applied monitoring plan /04/ is in compliance with the relevant approved CDM monitoring methodology;
- Whether the monitoring report /01/ and other supporting documents provided are complete and verifiable and in accordance with the monitoring plan and applicable CDM requirement;
- Whether the ER as set out in the monitoring report /1/ have been measured, calculated and reported in accordance with the requirements of the monitoring plan /04/, and

- Whether the reported data meet the key principles of data quality and are complete, reliable, consistent, accurate, valid, transparent and conservative.

ERM CVS also assessed whether the monitoring report and other supporting documents provided are complete in accordance with the latest applicable UNFCCC checklists and guidance for documentation required to be submitted with the Request for Issuance.

Scope and basis of verification work:

The verification is an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the DOE. Based on the key project information the verification addresses the implementation and operation of the project activity as set out in the PDD /03/, and the information and reported ER set out in the monitoring report prepared by the project participant (PP) for this monitoring period.

Only verification activities undertaken after the publication of the monitoring report on the UNFCCC CDM website are used as a basis for ERM CVS to conclude the verification and submit a request for issuance of CERs to the CDM EB.

The verification considers both quantitative and qualitative information on ER. The monitoring report is assessed, using a rule based approach, against the principles of accuracy, relevance, credibility, reliability, completeness, consistency, and transparency. Conservativeness is applied throughout the process to ensure that ER are not overstated.

ERM CVS conducts all its work under strict rules to safeguard impartiality and ensure the independence of the verification team. The verification does not provide any consulting or recommendations for the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

Conclusions:

In conclusion, based on the verification activities undertaken, ERM CVS concludes that the project activity is implemented and operated as described in the registered PDD.

During this monitoring period, several problems have been noted with the instrument AT-45094C (measuring the volumetric fraction of greenhouse gas), as indicated in maintenance reports. Additionally, the secondary catalyst has not been exchanged yet resulting in the reduction of its abatement capacity compared to previous monitoring periods. The DOE understands that on the one hand the readings of the instrument AT-45094C obtained during this monitoring period are not 100% reliable and that on the other hand the abatement system has underperformed or failed during the entire monitoring period, therefore no emissions reductions are eligible to be claimed during this monitoring period.

SECTION B. Verification team, technical reviewer and approver**B.1. Verification team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader	EI	Braulio	Pikman	ERM Brasil	Y	Y	Y	Y
2.	Verifier	EI	Correa	Alice	ERM Brasil	Y	Y	Y	Y

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	EI	Campbell	Lisa	ERM South Atlantic
2.	Technical reviewer	IR	Avis	Jonathan	ERM CVS London
2.	Approver	IR	Eddis	Melanie	ERM CVS London

SECTION C. Application of materiality**C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Not applicable as consideration of materiality was not considered in the planning of this verification in accordance with the "Guideline: Application of materiality in verifications".		Because this project uses automatic metering/measuring, ERM CVS checked 100% of the calibration information, all data collection and calculation in order to verify the ER number.	Not applicable

C.2. Consideration of materiality in conducting the verification

>>In the case of the project activity, an omission, misstatement, or erroneous reporting of information is considered material if it might lead, at an aggregated level, to an overestimation of the total ER or removals achieved by a registered CDM project activity equal to or higher than 0.5 per cent of the ER (project activities achieving a total ER equal to or more than 500,000 tCO₂e per year). The project uses automatic metering/measuring devices with automatic data extraction and automated calculations. ERM CVS checked 100% of the data associated to calibration, metering systems, all data collection procedures and formulas used in calculations in order to verify the ER number.

SECTION D. Means of verification**D.1. Desk/document review**

>> A detailed desk review was undertaken prior to the site visit. This included the PDD /03/, the monitoring plan /04/, the validation report /05/, the applied monitoring methodology, previous verifications reports /06/, relevant external data and reports, on-site documents, and relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board.

The desk review included:

- A review of the data and information presented to verify completeness and consistency in accordance with relevant CDM requirements;
- A review of the monitoring plan and monitoring methodology, including applicable tools, paying particular attention to the frequency of measurements, quality of metering equipment (including calibration requirements) and the quality assurance and quality control (QA/QC) procedures;
- An evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ER, and
- Review of the monitoring report to ensure it is completed as per the standardised format.

D.2. On-site inspection

Duration of on-site inspection: 29/01/2020				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the project implementation and operation as per the registered PDD /03/ (including site walk through to confirm physical existence and operation of project components) or any approved revised PDD;	Prillex America Plant, Mejillones	29/01/2020	Braulio Pikman Alice Correa
2.	Review of information flows for generating, aggregating and reporting the monitoring parameters;	Prillex America Plant, Mejillones	29/01/2020	Braulio Pikman Alice Correa
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan /04/. A list of all interviewees is included in Section D3;	Prillex America Plant, Mejillones	29/01/2020	Braulio Pikman Alice Correa
4.	A cross-check between information provided in the monitoring report /1/ and data from other sources such as log books, inventories, purchase records or similar data sources to establish the existence of a clear audit trail and records that validate or invalidate the stated data;	Prillex America Plant, Mejillones	29/01/2020	Braulio Pikman Alice Correa
5.	A check of monitoring equipment including calibration performance and observations of the monitoring practices against the requirements of the PDD /03/ and the selected methodology(is) and corresponding tool(s), where applicable;	Prillex America Plant, Mejillones	29/01/2020	Braulio Pikman Alice Correa
6.	A review of calculations and assumptions made in determining the GHG data and ER;	Prillex America Plant, Mejillones	29/01/2020	Braulio Pikman Alice Correa
7.	Identification of quality control procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.	Prillex America Plant, Mejillones	29/01/2020	Braulio Pikman Alice Correa

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Diaz	Josefina	ENAEX	29/01/2020	Data extraction/ER calculation/ events occurring during the monitoring period/calibration	Braulio Pikman Alice Correa
2.	Bichler	Sonja	Carbon Austria	29/01/2020	Data extraction/ER calculation/ events occurring during the monitoring period/calibration	Braulio Pikman Alice Correa
3.	Malatesta	Manuel	ENAEX	29/01/2020	Events occurring during the monitoring period/ Calibration/ site walk /production	Braulio Pikman Alice Correa
4.	Aliaga	Andres	ENAEX – Production & Process	29/01/2020	NA plant and EnviNOx operation	Braulio Pikman Alice Correa

D.4. Sampling approach

>> Not applicable

D.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	-	-
Compliance of the project implementation and operation with the registered PDD	-	-	2
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments			-
Assessment of data and calculation of ER or net removals		1	-
Assessment of reported sustainable development co-benefits			-
Global stakeholder consultation			-
Others (please specify): updated information on regulations, roles and responsibilities, and presence of physical TAGs on site)	2		1
Total	2	1	3

SECTION E. Verification findings**E.1. Compliance of the monitoring report with the monitoring report form**

Means of verification	ERM CVS evaluated whether the monitoring report has been prepared in accordance with the latest valid and applicable Monitoring Report Form and correctly presents the status of post registration changes that are relevant to the project activity.
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Findings	<p>The monitoring report was found to be correctly completed according to the latest valid form.</p> <p>The monitoring report was found, through document review, to correctly state the implementation and operational status of the project activity, in accordance with the Guidelines.</p>
Conclusion	<p>ERM CVS confirms that the monitoring report has been appropriately prepared using the applicable monitoring report form that all sections are completed and it complies with the latest valid monitoring report form and the instructions therein for filling out the form.</p> <p>ERM CVS confirms that the monitoring report correctly presents the status of post registration changes.</p> <p>For this project activity there have been no Post Registration Changes during this monitoring period.</p>

E.2. Remaining forward action requests from validation and/or previous verifications

>> *Not applicable*

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	<p>Based on the review of documentation provided, and the site visit, ERM CVS assessed whether all physical features of the project as described in the PDD are in place and that the PP have operated the project in accordance with operational criteria set out in the PDD /03/, and whether any deviation or the proposed or actual changes in the implementation or operation of the project activity comply with the requirements of the Project Standard.</p> <p>During the ERM CVS site visit, the verification team:</p> <ul style="list-style-type: none"> • Walked through the project site and inspected the project facility and its operations; • Checked the installed equipment, including the monitoring instruments, their name plates, and cross-checked them against the PDD and monitoring plan /03/04/ and the monitoring report/01/; • Interviewed the staff responsible for the monitoring and implementation of the project, and • Reviewed the relevant training materials and training records.
Findings	<p>ERM CVS confirms during the site visit that:</p> <ul style="list-style-type: none"> ▪ the installed capacity and number of units have not changed; ▪ no component has been added nor the technology has been extended; ▪ the project is still a single site activity, and the scale of the project has not changed. <p>The operation of the project during the monitoring period is confirmed to be in line with the operational assumptions made in the PDD /03/. During this monitoring period, there were no special events or situations that may impact the applicability of the methodology.</p> <p>ERM CVS confirms that the project activity operates as per the PDD /03/ and consists of a secondary N₂O abatement, composed of a N₂O catalyst inserted below the primary catalyst (NH₃ catalyst) in the ammonia oxidation reactor. ERM CVS therefore concluded that the project was implemented and equipment installed as described in the PDD and its monitoring plan /03/04/.</p>
Conclusion	<p>ERM CVS confirms, through the visual inspection that all physical features of the proposed CDM project activity have been implemented in accordance with the PDD /03/.</p> <p>The project activity is also confirmed to be fully operational in accordance with the PDD /03/.</p>

	<p>The information provided in the latest version of the monitoring report sections A and B correctly states the implementation and operational status of the project activity.</p> <p>ERM CVS confirms during the site visit that:</p> <ul style="list-style-type: none"> ▪ the installed capacity and number of units have not changed; ▪ no component has been added nor the technology has been extended; ▪ the project is still a single site activity; ▪ the scale of the project has not changed.
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E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents¹

>> Not applicable.

E.4.2. Corrections

>> Not applicable.

E.4.3. Change to the start date of the crediting period

>> Not applicable.

E.4.4. Inclusion of a monitoring plan

>> Not applicable.

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

>> Not applicable.

E.4.6. Changes to the project design

>> Not applicable.

E.4.7. Changes specific to afforestation and reforestation project activities

>> Not applicable.

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	The verification team reviewed the monitoring plan /04/ and compared it against the requirements of the applied methodology and the applicable tools.
Findings	ERM CVS confirms that the monitoring plan /04/ includes appropriate provisions for the organisation and management structure, monitoring and reporting procedures, measuring instruments, staff training, QA/QC procedures, and data management to comply with the monitoring methodology. QA/QC procedures include systematic calibration and equipment maintenance, inspections and third party "health checks" by equipment supplier/10/.

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

	<p>ERM CVS confirms that monitoring processes for the data and parameters, which are required to be monitored by the methodology, are included in the monitoring plan. The application of the monitoring methodology was found to be appropriate and ERM CVS confirms that the monitoring plan is consistent with the requirements of the approved methodology /8/.</p> <p>The methodology refers to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” and to the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”. ERM CVS has confirmed that the referred Tools were duly applied in this project activity and no standardized baselines are used according to the applied methodology.</p> <p>If data for either the N₂O concentration or the volume or mass flow of the tail gas are not available for more than 1/3 of any hour while the plant was in operation, the value for that hour shall be replaced with the maximum value of N₂O concentration or volume or mass flow of the tail gas observed during the monitoring period. If data for neither the N₂O concentration nor the volume or mass flow of the tail gas are available for more than 1/3 of any hour while the plant was in operation, the maximum value of mass flow of N₂O calculated during the monitoring period shall be applied to any such hour. Values observed during five operating hours before and after a plant start-up and shutdown shall not be used for the determination of the maximum values, in line with the applied methodology and the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”.</p> <p>ERM CVS did not note any relevant monitoring aspects that are not specified in the methodology, which may enhance the level of accuracy and completeness of the revised monitoring plan.</p>
Conclusion	ERM CVS confirms that the monitoring plan /04/ is in accordance with the approved methodology /08/ applied by the CDM project activity. No standardized baselines are used in the project activity according to the applied methodology.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	Data and parameters fixed ex-ante or at the renewal of the crediting period as listed in the monitoring report have been crosschecked and reviewed – as applicable – against the monitoring plan in the PDD as well as against the applied methodology and other relevant CDM related documentation. Therefore, the verification team evaluated the status of data and parameters that were determined at registration and not monitored during the monitoring period, including default values and factors, and confirmed whether they were correctly presented in Section D.1 of the monitoring report /01/ and applied correctly in the ER calculations spreadsheet /02/.
Findings	<p>The values of the parameters fixed ex-ante valid for this monitoring period as listed in chapter B.6.2 of the PDD are:</p> <ul style="list-style-type: none"> • Baseline N₂O emission factor for nitric acid production in year 2019 and accordingly in 2018 (related to 100 per cent pure acid): 2.70 kg N₂O/t HNO₃ and 2.80 kg N₂O/t HNO₃ • Global warming potential of N₂O valid for the commitment period: 298 • Universal ideal gases constant: 8,314 Pa.m³/kmol.K • Molecular mass of greenhouse gas i: 44.02 kg/kmol (N₂O) <p>The parameters were correctly presented in the monitoring report /01/ in line with the PDD. They have been applied appropriately in the ER calculation spreadsheet /02/.</p>
Conclusion	ERM CVS confirms that the parameters were correctly presented in the monitoring report /01/ and applied appropriately in the ER calculation spreadsheet /02/. All values are in compliance with relevant documentation such as the PDD and monitoring plan as well as the applied methodology, applied tools and other CDM related documentation, where applicable. Furthermore, ERM CVS confirms that the monitoring activities comply with the registered monitoring plan.

E.6.2. Data and parameters monitored

Means of verification	<p>ERM CVS assessed the information flow and data collection system by means of physical inspection of all major components of the information flow and data collection system as well as related documentation. Interviews with relevant staff were held in order to understand how the monitoring process is implemented, roles and responsibilities, and test staff competency. During the ERM CVS site visit, the verification team:</p> <ul style="list-style-type: none"> • Walked through the project site and inspected the project facility and its operations and the monitoring instruments; • Checked the installed equipment, including the monitoring instruments, their name plates, and cross-checked them against the PDD and monitoring plan /03/04/ and the monitoring report /01/; • Interviewed the staff responsible for the monitoring and implementation of the project, and • Reviewed the relevant training materials and training records. <p>Reviewed metering equipment specifications and calibration records, where relevant.</p>
Findings	<p>ERM CVS's detailed findings for each monitored parameter are presented in Appendix 5.</p> <p>The parameter <i>Volumetric flow of the gaseous stream in time interval t on a dry basis</i> is measured by a multiple pressure differentials type equipment, which allows continuous and real time measurements of the N₂O volumetric flow. The parameter <i>Volumetric fraction of greenhouse gas i in a time interval t on a dry basis</i> is measured by a non-dispersive infrared photometry (NDIR). Both equipment are found to be in line with the description provided in the PDD. The N₂O outlet data for mass flow/volume and concentration of tail gas are recalculated using the 2016 QAL 2 /25/26/ correction factors, in line with the requirements of the methodology and EN14181. The AST conducted during this monitoring period (conducted from 09/01/2019 to 10/01/2019)/25/ confirmed the last QAL 2 assessment/26/ is still valid with no need for a new complete QAL 2 campaign during this monitoring period.</p> <p>All CDM project related instruments and equipment are adjusted and/or calibrated according to a maintenance program based on industry standards and supplier specifications. This has been verified with the calibration planning and calibration certificates provided by PP. PP has also established a set of back up plans and emergency procedures for monitoring system to ensure availability of data what includes a contract with Emerson Process Management to execute onsite periodic "health checks"/10/. The operating and maintenance personnel has been trained /22/.</p> <p>Information flow and data collection procedures associated to the CDM Project consist of monitoring instrument transmitters converting the primary sensing signal (resistance, voltage, infrared light etc.) in a signal that is hardwired transmitted to I/O cards (input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information of field process variables, calculated variables or normalized variables. From the CHS database the Excel Macros transfer the data for the internal reports. Project parameters are exported from the digitally available daily reports to an excel book for calculation of baseline emissions, project emissions and ER according to formulae as required by the applicable methodology.</p> <p>The latest report from October 2019 /10/, indicated that DeltaV is working within the recommended parameters.</p> <p>ERM CVS has checked each and every one of these shutdowns and data generation during this period and its usage in the ER Calculation spread sheet.</p>

Conclusion	ERM CVS confirms that the all monitoring parameters stated in the monitoring plan /04/, the applied methodology /08/ and the relevant CDM EB decisions have been appropriately monitored. ERM CVS confirms that the monitoring activities comply with the registered monitoring plan. Please see Appendix 5 for further details.
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E.6.3. Implementation of sampling plan

Means of verification	Not applicable.
Findings	Not applicable.
Conclusion	Not applicable.

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	ERM CVS evaluated whether the calibration of measuring equipment that can have an impact on the claimed ER was conducted at the frequency specified in the applied monitoring methodology /08/ and/or the monitoring plan /04/. ERM CVS reviewed the status of the equipment on site, and reviewed documented technical specifications and calibration certificates where applicable. Please refer to Appendix 5 for details.
Findings	<p>If the calibration frequency deviates from the prescribed frequency, one of the two situations is applied:</p> <ul style="list-style-type: none"> a) Calibration has been delayed and the calibration has already been implemented (i.e. the results of delayed calibration are available). In this case, the PP must adopt a conservative approach in the calculation of ER by either: <ul style="list-style-type: none"> (i) If the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error - Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration or (ii) If the error is beyond the maximum permissible error of the measuring equipment - Applying the error identified in the delayed calibration test, b) Calibration has been delayed and the results are not available at the time of verification. In this case, ERM CVS will request the PP to conduct the required calibration and then apply a conservative approach as set out in (a) above. <p>If ERM CVS determines that it is not possible for the PP to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the UNFCCC Executive Board, and/or the monitoring plan due to reasons beyond the control of PP, the requirements for post registration changes in section are followed (see section 6).</p> <p>In cases where neither the monitoring methodology nor the monitoring plan specify any requirements for calibration frequency for measuring equipment, ERM CVS determines whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification or, if neither are available, appropriate international standards may be used.</p> <p>The status of instrument calibration for this monitoring period is set in Appendix 5 below. In line with the requirements of EN14181 a QAL2 /26/ was conducted in November 2016 and is valid for 5 years. An AST/25/ has been done in January 2018 and again in January 2019. The 2018 and 2019 ASTs confirmed the calibration function of the 2016 QAL2, therefore all readings were considered to be correctly recalculated using the correction factors from the 2016 QAL2 and no issue has been raised by ERM CVS.</p> <p>Applicable QAL2 Correction factors for this monitoring period are:</p>

	$V_{t,db}$ -Volumetric flow of the gaseous stream in time interval t on a dry basis (Nm ³ dry gas)	0,000	QAL2 2016 intercept a)
		0,969	QAL2 2016 slope b)
	$V_{i,t,db}$ -Volumetric fraction of greenhouse gas i in the gaseous stream in a time interval t on a dry basis (Nm ³ gas i / Nm ³ dry gas) - RANGE 1	-50,00	AMS parameter, a)
		12,50	AMS parameter, b)
		-49,90	QAL2 2016 parameter, a)
		12,47	QAL2 2016 parameter, b)
	$V_{i,t,db}$ -Volumetric fraction of greenhouse gas i in the gaseous stream in a time interval t on a dry basis (Nm ³ gas i / Nm ³ dry gas) - RANGE 2	-500,00	AMS parameter, a)
		125,00	AMS parameter, b)
		-498,80	QAL2 2016 parameter, a)
		124,69	QAL2 2016 parameter, b)
	<p>QAL3 has been duly implemented by PP consisting of zero and span checks and adjustment as necessary. According to the latest AST/25/, QAL3 meets the demand of EN14181.</p> <p>The calibration requirements for the current period were checked with the reference documents (PDD, international standards and manufacturer's information, etc.) and found to be in compliance with the guideline for assessing compliance with the calibration requirements including the application of calibration delay guidance.</p> <p>Calibration delay during this period occurred associated to the equipment:</p> <ul style="list-style-type: none"> • TT-45093 - tail gas temperature transmitter; • Equipment with TAGs PT-45095 and PT-45091, both tail gas pressure transmitters. <p>In all cases calibration delay guidance has been duly applied by PP in the initial version of the MR.</p>		
	Conclusion	<p>ERMCVS confirms that the calibration of the measuring equipment was conducted at the specified frequency (in the applied monitoring methodology and/or the approved monitoring plan), and were applicable, calibration delay guidance has been duly applied.</p>	

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	<p>ERM CVS evaluated the data and calculations of baseline emissions of the project activity by the application of the selected approved methodology.</p> <p>In conducting this evaluation, the verification team evaluated whether:</p> <ul style="list-style-type: none"> • A complete set of data for the monitoring period was available, <ul style="list-style-type: none"> ○ If only partial data are found to be available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan (or approved revised monitoring plan), ERM CVS will raise a CAR for the PP to comply with the requirements of the Project standard or submit a request for deviation prior to submitting the request for issuance, • Information provided in the monitoring report has been cross checked with other sources such as log books (DeltaV raw data), laboratory analysis; • Calculations of baseline emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied
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	<p>methodology;</p> <ul style="list-style-type: none"> Any assumptions used in the emission calculations have been justified; Appropriate emission factors, IPCC default factors and other reference values have been correctly applied.
Findings	<p>During this monitoring period, several problems have been noted with the instrument AT-45094C (measuring the volumetric fraction of greenhouse gas), as indicated in maintenance reports. Additionally, the secondary catalyst has not been exchanged yet resulting in the reduction of its abatement capacity compared to previous monitoring periods. The DOE understands that on the one hand the readings of the instrument AT-45094C obtained during this monitoring period are not 100% reliable and that on the other hand the abatement system has underperformed or failed during the entire monitoring period, therefore no emissions reductions are eligible to be claimed during this monitoring period and baseline emissions have been therefore considered as zero.</p>
Conclusion	<p>Due to problems with monitoring equipment, data on the volumetric fraction of greenhouse gas for this monitoring period is not reliable. Additionally the abatement system has underperformed or failed during the entire monitoring leading to no emission reduction being eligible to be claimed.</p>

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	<p>ERM CVS evaluated the data and calculations of project emissions resulting from the project activity by the application of the selected approved methodology. In conducting this evaluation, the verification team evaluated whether:</p> <ul style="list-style-type: none"> A complete set of data for the monitoring period was available, <ul style="list-style-type: none"> If only partial data are found to be available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan (or approved revised monitoring plan), ERM CVS will raise a CAR for the PP to comply with the requirements of the Project standard or submit a request for deviation prior to submitting the request for issuance, Information provided in the monitoring report has been cross checked with other sources such as log books (DeltaV raw data), laboratory analysis; Calculations of project activity emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology; Any assumptions used in the emission calculations have been justified; Appropriate emission factors, IPCC default factors and other reference values have been correctly applied.
Findings	<p>During this monitoring period, several problems have been noted with the instrument AT-45094C (measuring the volumetric fraction of greenhouse gas), as indicated in maintenance reports. Additionally, the secondary catalyst has not been exchanged yet resulting in the reduction of its abatement capacity compared to previous monitoring periods. The DOE understands that on the one hand the readings of the instrument AT-45094C obtained during this monitoring period are not 100% reliable and that on the other hand the abatement system has underperformed or failed during the entire monitoring period.</p>

	Therefore no emissions reductions are eligible to be claimed during this monitoring period.
Conclusion	Due to problems with monitoring equipment, data on the volumetric fraction of greenhouse gas for this monitoring period is not reliable. Additionally the abatement system has underperformed or failed during the entire monitoring leading to no emission reduction being eligible to be claimed.

E.8.3. Calculation of leakage GHG emissions

Means of verification	No leakage is considered under the Methodology.
Findings	No leakage is considered under the Methodology.
Conclusion	No leakage is considered under the Methodology.

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	<p>ERM CVS evaluated the data and calculations of ER resulting from the project activity by the application of the selected approved methodology.</p> <p>In conducting this evaluation, the verification team evaluated whether:</p> <ul style="list-style-type: none"> • A complete set of data for the monitoring period was available, • Information provided in the monitoring report has been cross checked with other sources such as log books (DeltaV raw data), laboratory analysis; • Calculations of ER have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology, or conservative assumptions have been applied; • Any assumptions used in the ER calculations have been justified; • Appropriate emission factors, IPCC default factors and other reference values have been correctly applied.
Findings	<p>During this monitoring period, several problems have been noted with the instrument AT-45094C (measuring the volumetric fraction of greenhouse gas), as indicated in maintenance reports. Additionally, the secondary catalyst has not been exchanged yet resulting in the reduction of its abatement capacity compared to previous monitoring periods. The DOE understands that on the one hand the readings of the instrument AT-45094C obtained during this monitoring period are not 100% reliable and that on the other hand the abatement system has underperformed or failed during the entire monitoring period.</p> <p>No emissions reductions are eligible to be claimed during this monitoring period.</p>
Conclusion	The abatement system has underperformed or failed during the entire monitoring period, leading to (number of hours of operation) to be equal to the number of hours where the N ₂ O abatement system was not underperformed or failed) and therefore ER are mathematically zero. ERM CVS confirms that the calculation of emission reduction as set out in the ER calculation spreadsheet /02/ is in line with the monitoring plan, methodology and relevant tools.

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	ERM CVS reviewed the monitoring report to confirm that the PP has compared the ER with the number of ER estimated in the PDD for an equivalent number of days as the monitoring period.
Findings	ERM CVS has reviewed the ER stated in the monitoring report and confirms that the PP has presented a clear comparison of the ER during the monitoring period with the prediction in the PDD.

	<p>The ER for this monitoring period predicted in the registered PDD have been correctly calculated as 216,587 tCO₂e.</p> <p>The total ER for the period of 0 tCO₂e (zero tCO₂e) were therefore found to be lower than had been predicted in the PDD.</p>
Conclusion	ERM CVS confirms that the PP has appropriately presented the ER for the monitoring period and these were lower than predicted.

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	ERM CVS reviewed the monitoring report to confirm that the PP has compared the ER with the number of ER estimated in the PDD for an equivalent number of days as the monitoring period. The total ER for the period were therefore found to be lower than had been predicted in the PDD.
Findings	As the ER are less than the estimation in the PDD for an equivalent number of days, no further explanation is required.
Conclusion	ERM CVS confirms that the PP has appropriately presented the ER for the monitoring period and these were lower than the prediction in the PDD.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	ERM CVS reviewed the monitoring report to check whether the PP has correctly presented the actual ER or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards.
Findings	All ER during this monitoring period have occurred during the second commitment period, after 31 December 2012.
Conclusion	ERM CVS confirms that the PP has correctly presented the actual ER or net anthropogenic GHG removals by sinks (from 1 January 2013 onwards).

E.9. Assessment of reported sustainable development co-benefits

Means of verification	Not applicable – the project participants have not chosen to develop a separate document describing how they plan to monitor sustainable development co-benefits of the CDM project activity, nor have they requested ERM CVS to verify any monitoring results of the sustainable development co-benefits of the registered CDM project activity.
Findings	N/A
Conclusion	N/A

E.10. Global stakeholder consultation

Means of verification	Not applicable – the stakeholder consultation was conducted before registration of the CDM project activity.
Findings	N/A
Conclusion	N/A

SECTION F. Internal quality control

>> The verification activities and content of the report are subject to a review by an independent technical reviewer. The role of the Technical Reviewer is to provide oversight that all procedures have been followed by the verification team and all conclusions justified and supported by evidence. The Technical Reviewer will either accept or reject the recommendations made by the verification team.

SECTION G. Verification opinion

>> ERM CVS based its verification work on:

- the approved methodology applied in the project design document (PDD);
- the registered PDD;
- previous verification reports;
- the CDM Validation and Verification Standard for project activities (VVS) v2.0;

- the CDM Project Standard for project activities (PS) and Project Cycle Procedure for project activities (PCP), both v.2.0;
- UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords;
- Relevant decisions, guidance and clarifications of the CMP and CDM Executive Board and any other information and references relevant to the project activities' reported ER.

Based on the verification activities undertaken, ERM CVS concludes that the project activity is implemented and operated as described in the registered Project Design Document.

The GHG ER set out in the monitoring report version v.01.1 dated 17/02/2020 were found to be appropriately measured and calculated in accordance with the applied methodology ACM0019 v2 (N₂O Abatement from Nitric Acid Production) and the monitoring plan set out in the PDD, v.1.4, dating from 17/09/2014.

Due to problems with monitoring equipment, data on the volumetric fraction of greenhouse gas for this monitoring period is not reliable. Additionally the abatement system has underperformed or failed during the entire monitoring leading to no emission reduction being eligible to be claimed.

Based on the verification activities undertaken, ERM CVS concludes that the reported ER (zero) for the monitoring period 01/12/2018 to 30/11/2019 are conservatively stated.

SECTION H. Certification statement

>>

Basis of verification	<p>ERM CVS based its verification work on:</p> <ul style="list-style-type: none"> ▪ the approved methodology applied in the PDD; ▪ the registered PDD; ▪ previous verification reports; ▪ the CDM Validation and Verification Standard (VVS) for project activities V2.0, ▪ the CDM Project Standard for project activities (PS) and Project Cycle Procedure (PCP) for project activities, both v.2.0; ▪ UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords; ▪ Relevant decisions, guidance and clarifications of the CMP and CDM Executive Board and any other information and references relevant to the project activity's reported emission reductions; ▪ Relevant guidance and clarification of the Executive Board applicable to this project
Responsibilities of ERM CVS	ERM CVS is responsible to provide an independent verification conclusion on the reported greenhouse gas (GHG) emission reductions for the Project Activity during the relevant monitoring period. The verification activities included desk review, site visit, close out of open issues, preparation of report and technical review.
Responsibilities of Project Participants	The Project Participants (PPs) are responsible for the preparation of the information and GHG emissions data and the reported GHG emissions reductions of the Project Activity on the basis set out within the applicable monitoring plan.
ERM CVS Opinion	<p>Based on the verification activities undertaken, ERM CVS concludes that the reported ER for the monitoring period 01/12/2018 to 30/11/2019 are conservatively stated.</p> <p>Please see section G above for the detailed verification opinion.</p>

Total GHG emission reductions certified	The total GHG emission reductions certified for this monitoring period are: 0 tCO ₂ e (zero tonnes CO ₂ equivalent)		
Lead Verifier Name: Braulio Pikman			
Technical Reviewer Name: Lisa Campbell			
Technical Reviewer Name: Jonathan Avis			
Approved by		Signature 	
Name: Melanie Eddis, Partner			
Date: 22 May 2020			

Appendix 1. Abbreviations

Abbreviations	Full texts
AMS	Automated Monitoring System
AOR	Ammonia Oxidation Reactor
AST	Annual Surveillance Test
CHS	Continuous Historian Server
DCS	Distributed Control System
ER	Emission Reductions
NA	Nitric Acid
PP	Project Participants
QAL1/2/3	Quality Assurance Level

Appendix 2. Competence of team members and technical reviewers

Alice Correa has been working in the Climate Change field since 2010 and has more than 20 years of professional experience in the environmental area. She has been involved in environmental audits and is experienced in developing documents and management system compatible with ISO 14001, OSHAS 18001, Ecuador Principles among others. She has conducted more than 100 projects associated to environmental audits/assessments for companies in diverse business sectors including chemical industries and has developed of GHG inventory for tobacco industry, which included the agricultural and processing activities. She has training as Lead Assessor for Mergers & Acquisitions, Auditing, Foundation Course in Environmental Auditing (EARA registered) and Advanced Environmental Management System Auditor. She is a civil engineer and has a Ph.D. in Engineering from the University of São Paulo and M.Sc. Environmental Sanitation (Chemical Engineering) from the University of Gent, Belgium.

Braulio Pikman has over 25 years of experience in GHG, energy and air quality related initiatives. He has extensive experience with the oil and gas and energy sectors. He is an expert in thermal measurements, combustion, energy efficiency, Climate Change, CDM Methodologies related to adipic acid, nitric acid and caprolactam production and EN 14181 uses. He has coordinated the Thermal Measurements Laboratory of the Technological Research Institute of Sao Paulo for 10 years, working with Combustion & Gasification Experimental Diagnostics, Air Emissions Monitoring & Control, development of instrumentation for measurements in flames and Energy Conservation Projects to the Oil & Gas Sector, Petrochemical and also Pulp & Paper. He has been responsible for the energy conservation program of the National Petroleum Agency of Brazil from 2000 to 2002 regarding the industrial and Transportation Sectors. Finally he is a member of the Methodological Panel of the United Nations Framework Convention on Climate Change since June 2005.

Lisa Campbell has over 30 years of experience in GHG and energy related programs and is a Senior Partner in ERM. Lisa has been providing climate change services to industry since the late 1980s, and joined ERM in 2007. Prior to consulting, she was a process design engineer in the chemical industry for a decade. As a design engineer, she has experience with the evaluation of chemical reactions and stoichiometric calculations for reaction yield and equipment design. She has evaluated and designed various emissions abatement technologies, including caustic scrubbers, cryogenic condensers, catalytic destruction processes, absorption technologies, selective catalytic reduction (SCR), non-selective catalytic reduction (NSCR), thermal oxidation, flaring. She is a Chemical Engineer and registered Professional Engineer in North Carolina. Her experience includes project design document development for oil and gas industry CDM and offset projects and development of CDM methodologies for cement and oil and gas industries. She also has experience in CDM project validation, verification, and technical review roles.

Jonathan Avis has over 15 years of experience in carbon markets and has acted as the auditor or technical reviewer for more than 150 carbon offset projects in a range of sectors including power (hydro, wind, solar, geothermal, biomass), waste management, industrial energy recovery, and household energy in developing

countries. Jonathan also has substantial experience in the assessment of environmental and social impacts of energy projects, against a variety of criteria including the Gold Standard for carbon offset projects, and the World Commission on Dams for large hydro. In addition to this, Jonathan is an experienced assessor of environment (ISO 14001), health and safety (EHS) management systems (OHSAS 18001/ISO 45001) and energy management systems (ISO 50001) in a range of sectors. Prior to joining ERM CVS, Jonathan worked as a researcher into clean energy in developing countries at the University of Oxford, and as a manager at the carbon trading firm EcoSecurities Ltd. Jonathan holds a BA in Geography (1st Class Hons) from the University of Oxford, and an MSc in Environmental Change and Management, also from the University of Oxford (Distinction).

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	PP	<p>Monitoring Report for “Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.” (UNFCCC #5393);</p> <p>PANNA 4 of Enaex S.A. – 11th Monitoring Report v01.0 (made available for public consultation)</p> <p>PANNA 4 of Enaex S.A. – 11th Monitoring Report v01.1 (final)</p>	-	PP
2	PP	<p>ER Calculation spread sheet</p> <p>PANNA 4 of Enaex S.A. – 11th ER Calculation spreadsheet version 1.0 (file: 5393_MP11_ER Calc v1.0_confidential)</p> <p>PANNA 4 of Enaex S.A. – 11th ER Calculation spreadsheet version 1.1 (file: 5393_MP11_ER Calc v1.1_confidential)</p>	-	PP
3	PP	<p>Project Design Document</p> <p>Registered Project Design Document: “Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.” – v1.4 dated 17/09/2014</p>	Available at UNFCCC website	UNFCCC
4	PP	<p>Monitoring Plan</p> <p>Registered Project Design Document: “Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.” – v1.4 dated 17/09/2014 (monitoring plan in section B.7)</p>	Available at UNFCCC website	UNFCCC
5	TUV Nord	<p>Validation Report</p> <p>Validation report prepared by TUV Nord for Catalytic N₂O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A. rev 0.1 dating 04/10/2011</p>	Available at UNFCCC website	UNFCCC
6	TUV Sud	<p>Previous Verification Reports associated to the second crediting period:</p>	Available at UNFCCC website	UNFCCC

		<p>Reports issued by TUV Sud for monitoring period #01 through #08</p> <p>Reports issued by ERM CVS for monitoring period #9 to 10</p>		
7	UNFCCC	<p>Project view page on the UNFCCC website</p> <p>http://cdm.unfccc.int/Projects/DB/RWTUV1320421146.84/view</p>	-	UNFCCC
8	UNFCCC	<p>Approved Methodology and methodological tools applied for the project:</p> <p>ACM0019 v2 - N2O Abatement from Nitric Acid Production</p> <p>“Tool to determine the mass flow of a greenhouse gas in a gaseous stream” in its latest version</p> <p>“Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” in its latest version</p>	Available at UNFCCC website	UNFCCC
9	UNFCCC	<p>CDM project Standard for project activities, version 02.0</p> <p>and</p> <p>CDM validation and verification standard for project activities, version 02.0</p>	Available at UNFCCC website	UNFCCC
10	EMERSON	Emerson onsite health checks reports (DELTAV_ Diagnostico En Sition Panna4 (14 a 18 oct 2019) and Delda V_Reporte técnico de servicio (oct 2019)		PP
11	PP	Mantenimiento de Instrumentos críticos para Proyecto de Abatimiento de N ₂ O (<i>Procedure on the maintainance of critical instruments for N2O abatement project</i>)		PP
12	Endress + Hauser and h&d	Acid Production Flow Transmitter /coriolis (FT-45026 and TT-45050) calibration reports		
13	Endress + Hauser	Acid Production Flow Transmitter (FT-45026 and TT-45050) – equipment specifications		PP
14	ENAEX	AOR Temperature Transmitter (TT-45030A, TT-45030B and TT-45030C) calibration		

		reports		
15	WiKA	AOR Temperature Transmitter (TT-45030A, TT-45030B And TT-45030C) – Acceptance test certificate		PP
16	PP	Production records: Production records: Listado de Producciones diarias Planta Prilex America) - cross check)		PP
17	Durag	Differential pressure transmitter (FT-45092)– equipment manual		PP
18	Emerson Process Management	Non-dispersive infrared photometry for N ₂ O (AT-45094C) specifications		PP
19	ENAEX	Tail gas temperature transmitter (TT-45093) calibration reports		PP
20	Rosemount	Tail gas temperature transmitter (TT-45093) calibration reports		PP
21	ENAEX	Capacitive Differential pressure transmitter (PT-45091)		PP
22	ENAEX	Training records: -SC Training -On-site operation Training - Analyzer and DeltaV training		
23	ENAEX	Capacitive Barometric pressure transmitter (PT-45095)		PP
24	ENAEX	Programa de Calibración Bono Carbono PAN_4 2020 (Carbon credirt Panna 4 calibartion Program)		PP
25	Airtec	AST Report 2019 (FILE 18- 262_ENAEX AST report 2018_Panna4_20180306_pdf)		PP
26	Airtec	QAL 2 report 2016 (file 16- 261_Panna4 - 22.02.2017_FINAL.pdf) - test dating from 17/11/2016 to 19/11/2016)		PP

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verifications

FAR ID	Section no.	E.2	Date:DD/MM/YYYY
Description of FAR			
N/A			
Project participant response			Date:DD/MM/YYYY
Documentation provided by project participant			
DOE assessment			
			Date:DD/MM/YYYY

Table 2. CL from this verification

CL ID	01	Section no.	B	Date: 29/01/2020
Description of CL				
<i>PP to please provide information on the status on N₂O regulation in Chile, including the Carbon Tax Regime.</i>				
Project participant response				Date: 27/02/2020
<i>It was confirmed by the Ministerio del Medio Ambiente of Antofagasta region that there is no regulation to chemical industry sector regarding N₂O emissions.</i>				
Documentation provided by project participant				
<i>Consulta SMA CMD_RESPUESTA.pdf Email – Impuesto Verde en Reforma Tributaria</i>				
DOE assessment				Date: 03/03/2020
ERM CVS has received the letter prepared by SEREMI (<i>Ministerio del Medio Ambiente –Region de Antofagasta</i> – Ministry of Environment Antofagasta Region) dating from 12/02/2020 confirming that there are no national regulations that establishes limits to N ₂ O emissions.				
Additionally, ERM CVS received an information as email sent by the University of Chile with details on the upcoming emission taxes. The DOE also conducted internet search to better understand the topic and confirms based on the evidences obtained, that this matter does not impact the project.				
CL01 is closed.				

CL ID	02	Section no.	C	Date: 29/01/2020
Description of CL				
<i>PP please to update the responsibility chart to reflect the recent changes and provide evidence of training of the new comers.</i>				
Project participant response				Date: 27/02/2020 and 19/03/2020
<i>The chart on p. 10 of MR was updated accordingly.</i>				
Documentation provided by project participant				
<i>MR v1.1 Qualification certificates of project participant</i>				
DOE assessment				Date: 23/03/2020
ERMCVS has verified the update MR and confirms that the responsibility chart has been up dated accordingly to PP response and that this update reflects the organization structured identified during the site visit.				
ERMCVS also verified the qualification evidences provided by PP and concludes that the professional in charge of the operational aspects of the CDM projects is competent based on his has professional qualification is evidenced by his graduate and post graduate certificates and professional experience.				
CL02 is closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	D.2	Date: 29/01/2020
Description of CAR				

During this monitoring period, several problems have been noted with the instrument AT-45094C (measuring the volumetric fraction of greenhouse gas), including as indicated in maintenance reports. Additionally, the secondary catalyst hasn't been exchanged for 4 years resulting in an expressive reduction of its abatement capacity compared to previous monitoring periods.

Although PPs have addressed most of these problems in the ER calculation sheet and MR the DOE understands that on the one hand the readings of the instrument AT-45094C obtained during this monitoring period are not 100% reliable and that on the other side the abatement system has underperformed or failed during the entire monitoring period.

PP to please recalculate ER taking this in consideration.

Project participant response	Date: 27/02/2020
<i>PPs have revised the ER calculation sheet and set parameter $h_{r,y} = 1$ for all hours, leading to zero ERs claimed for the entire monitoring period. The MR was adapted accordingly.</i>	
Documentation provided by project participant	
<i>ERM Calculation spreadsheet v1.1</i>	
DOE assessment	Date: 03/03/2020
ERMCVS confirms that the correction have been duly done and are conservative.	
CAR01 is closed.	

Table 4. FAR from this verification

FAR ID	01	Section No.	D.2	Date: 29/01/2020
Description of FAR				
<i>PP to register and include as part of the project documentation, a formal cross check of nitric acid production values.</i>				
Project participant response				Date: DD/MM/YYYY
N/A				
Documentation provided by project participant				
N/A				
DOE assessment				Date: DD/MM/YYYY
N/A				

FAR ID	02	Section No.	N/A	Date: 29/01/2020
Description of FAR				
<i>Project instruments should have physical TAGs in place and well maintained in order to permit an easy and fast identification of the project equipment.</i>				
Project participant response				Date: DD/MM/YYYY
N/A				
Documentation provided by project participant				
N/A				
DOE assessment				Date: DD/MM/YYYY
N/A				

FAR ID	03	Section No.	D.2	Date: 29/01/2020
Description of FAR				
<i>PP to register and include as part of the project documentation a cross check of certificates of the standard gas of the AMS per cylinder.</i>				
Project participant response				Date: DD/MM/YYYY
N/A				
Documentation provided by project participant				

N/A	
DOE assessment	Date: DD/MM/YYYY
N/A	

Appendix 5- Data and parameters monitored

The verification findings for the monitoring of each parameter are set out below.

Data / Parameter:	P _{production,y}	Baseline emissions	
Data unit:	t HNO ₃		
Description:	Production of nitric acid in year y		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring equipment appropriately installed and operated and are the QA/QC procedures appropriately applied?	<p>ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan.</p> <p>a) Equipment specification Nitric Acid Production Coriolis Flow and density transmitter (flowmeter FT-45026 with accuracy class ± 0.15% and temperature transmitter TT-45050 with accuracy class 0.1%).The equipment is found to be in line with the monitoring plan/methodology in terms of specification and accuracy.</p> <p>b) Calibration Every 2 years. Calibration information in provided in the final version of the Monitoring Report is confirmed to be correctly reported. ERM CVS confirms that the calibrations have been undertaken as required and were valid throughout the monitoring period. The calibrations have confirmed that the equipment has performed to the required level of accuracy.</p> <p>c) Measurement/reading/recording frequency Measuring: Continuously with readings every 1 seconds. Data is recorded hourly.</p> <p>d) QA/QC procedures applied Periodic calibration is performed according to supplier's recommendations. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the plants ISO 9001:2008 management system.</p> <p>e) Cross check</p> <ul style="list-style-type: none">• The daily nitric acid production data from the ER Calculation spread sheet was crosschecked for consistency with the daily nitric acid production from DeltaV daily reports (MDI files) and Foxboro /16/. These reading are confirmed to have been duly corrected considering the concentration and density of the nitric acid.• ERM CVS checked that the production reported is consistent with the nameplate capacity of the plant.• ERM CVS checked that raw data has been correctly transferred to the calculation tool. <p>f) Check of information flow</p>	OK	OK

Data / Parameter:	P_{production,y}	Baseline emissions	
Data unit:	t HNO ₃		
Description:	Production of nitric acid in year y		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	<p>The monitoring instrument transmitters convert the primary sensing signal in a signal that is hardwired transmitted to I/O cards (input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information. From the CHS database the Excel Macros transfer the data for the internal reports. The parameter is exported from the digitally available reports to an excel book for calculation.</p> <p>In addition, the NA at 100% is calculated by multiplying the mass flow with the concentration. The concentration is automatically calculated using the density measurement of the Coriolis flowmeter and the temperature instrument TT- 45050.</p>		
Does the monitoring report (section D) correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period?	<p>ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review.</p> <p>ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period.</p>	OK	OK
Conclusion	<p>ERM CVS confirms that</p> <ul style="list-style-type: none"> • The equipment for monitoring has an appropriate accuracy and has been controlled and operated in accordance with the monitoring plan. • The calibrations have been conducted at the frequency as specified by the methodology and the monitoring plan of the registered PDD and/or manufacture specifications. • The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan. • QA/QC procedures have been applied in accordance with the monitoring plan. 		

CDM VER FORM			
Data / Parameter:	h_y	Project emissions	
Data unit:	h		
Description:	Number of hours of operation in year y		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring equipment appropriately installed and operated and are the QA/QC procedures appropriately applied?	<p>ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan.</p> <p>a) Equipment specification AOR Temperature Transmitter (TAG TT-45030A (main), TT-45030B (back up) and TT-45030C (back up))/ thermocouple have accuracy class: $\pm 0.25\%$.The equipment is found to be in line with the monitoring plan/methodology in terms of specification and accuracy.</p> <p>b) Calibration Every 2 years. Calibration information in provided in the final version of the Monitoring Report is confirmed to be correctly reported. ERM CVS confirms that the calibrations have been undertaken as required and were valid throughout the monitoring period. The calibrations have confirmed that the equipment has performed to the required level of accuracy.</p> <p>c) Measurement/reading/recording frequency The parameters is measured continuously with reading every 1 seconds. Data is recorded hourly.</p> <p>d) QA/QC procedures applied Periodic calibration is performed according to supplier's recommendations. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the plants ISO 9001:2008 management system.</p> <p>e) Cross check</p> <ul style="list-style-type: none">• The hours of operation are determined by the oxidation temperature in the AOR. As determined in the PDD, the temperature ranges from 850 – 905°C correspond to the hours of operation of the CDM project (the plant is considered to be in operation when the temperature is within this range). ERM CVS has therefore crosschecked the temperature ranges occurring during this monitoring confirming that in the Excel spread sheet the plant is considered ON when temperature is within the indicated range.• Cross crosschecked the replacement of the thermocouples that occurred during this monitoring period, confirming that the accuracy class in all cases has remained the same and that new equipment where duly calibrated during the monitoring period. <p>f) Check of information flow</p>	OK	OK

Data / Parameter:	h_y	Project emissions	
Data unit:	h		
Description:	Number of hours of operation in year y		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	The monitoring instrument transmitters convert the primary sensing signal in a signal that is hardwired transmitted to I/O cards (Input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information. From the CHS database the Excel Macros transfer the data for the internal reports. The parameter is exported from the digitally available reports to an excel book for calculation.		
Does the monitoring report (section D) correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period?	ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review. ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period.	OK	OK
Conclusion	ERM CVS confirms that <ul style="list-style-type: none">The equipment for monitoring has an appropriate accuracy and has been controlled and operated in accordance with the monitoring plan.The calibrations have been conducted at the frequency as specified by the methodology and the monitoring plan of the registered PDD and/or manufacture specifications.The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.QA/QC procedures have been applied in accordance with the monitoring plan.		

Data / Parameter:	h _{r,y}	Baseline and Project emissions		
Data unit:	h			
Description:	Number of hours (h) in year y where for secondary N ₂ O abatement system was not installed, underperformed or failed			
Measured/calculated/default	Measured			
Compliance question	Verification findings		Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring equipment appropriately installed and	ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan. a) Equipment specification		OK	OK

Data / Parameter:	$h_{r,y}$	Baseline and Project emissions	
Data unit:	h		
Description:	Number of hours (h) in year y where for secondary N ₂ O abatement system was not installed, underperformed or failed		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
operated and are the QA/QC procedures appropriately applied?	<p>As the project has not used AM0028 or AM0034 in the first crediting period (Case 2 for the calculation of $h_{r,y}$ as defined in the applied methodology), the abatement system is deemed to be not installed, underperforming or failed in the hour h in year y, if:</p> $F_{N2O,tailgas,h} > EF_{new,y} \times P_{NA,h}$ <p>b) Calibration Not applicable</p> <p>c) Measurement/reading/recording frequency The parameter is measured continuously with 1 second readings and hourly recording.</p> <p>d) QA/QC procedures applied The quality assurance and quality control procedures, in terms of plant equipment operations and maintenance have been incorporated in the plants ISO 9001:2008 management system.</p> <p>e) Cross check The verifiers went through the ER calculation spread sheet values, results were checked against raw data. Value are correctly considered in line with methodology in the final version of the MR and ER calculation spreadsheet. The abatement system has underperformed or failed during the entire monitoring period.</p> <p>f) Check of information flow The monitoring instrument transmitters convert the primary sensing signal in a signal that is hardwired transmitted to I/O cards (input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information. From the CHS database the Excel Macros transfer the data for the internal reports. The parameter is exported from the digitally available daily reports to an excel book for calculation.</p>		
Does the monitoring report (section D) correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period?	<p>ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review.</p> <p>ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period.</p>	OK	OK
Conclusion	ERM CVS confirms that		

CDM VER FORM			
Data / Parameter:	$h_{r,y}$	Baseline and Project emissions	
Data unit:	h		
Description:	Number of hours (h) in year y where for secondary N ₂ O abatement system was not installed, underperformed or failed		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	<ul style="list-style-type: none">• The equipment for monitoring has an appropriate accuracy and has been controlled and operated in accordance with the monitoring plan.• The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.• QA/QC procedures have been applied in accordance with the monitoring plan.		

Data / Parameter:	V _{t,db}	Project emissions	
Data unit:	m ³ dry gas/h		
Description:	Volumetric flow of the gaseous stream in time interval t on a dry basis		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring equipment appropriately installed and operated and are the QA/QC procedures appropriately applied?	<p>ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan.</p> <p>a) Equipment specification PP uses differential pressure transmitter (TAG FT-45092), with accuracy class 2% of range. The equipment is found to be in line with the monitoring plan/methodology in terms of specification and accuracy.</p> <p>b) Calibration Calibration of the meter occurs every 5 years according to EN 14181 (QAL2) and an AST is performed annually. QAL3 is done on a daily basis for zero check and every other day for span by ENAEX maintenance staff. Calibration information as provided in the final version of the Monitoring Report is confirmed to be correctly reported. ERM CVS confirms that the calibrations have been undertaken as required and were valid throughout the monitoring period. The calibrations have confirmed that the equipment has performed to the required level of accuracy. In line with the requirements of EN14181, a QAL2 /26/ was conducted in November 2016 and is valid for 5 years. An AST/25/ has been done in January 2018 and January 2019. The 2018 and 2019 AST confirmed the calibration function of the 2016 QAL2, therefore all readings were considered to be correctly recalculated using the correction factors from the 2016 QAL2.</p>	OK	OK

Data / Parameter:	$V_{t,db}$	Project emissions	
Data unit:	m ³ dry gas/h		
Description:	Volumetric flow of the gaseous stream in time interval t on a dry basis		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	<p>c) Measurement/reading/recording frequency Measuring is continuous with reading every 1 seconds. Data is recorded hourly.</p> <p>d) QA/QC procedures applied The quality assurance and quality control procedures are based on the application of the requirements of EN 14181.</p> <p>e) Cross check</p> <ul style="list-style-type: none"> ERM CVS has cross checked the consistency between raw data and input data in the ER calculation spreadsheet and it's used in calculations, including all equipment failures reported during this monitoring period and confirm data substitution as per methodology. The verifiers went through the ER Calculation spread sheet values, and confirm that all substitutions for default value were clearly and correctly considered in line with the methodology. The verifiers checked the usage of the correction factors obtained in the QAL2/26/. The verifiers crosschecked calibration certificates (calibration internal reports). All EN 14181 procedures are implemented and recorded/25/26/. These procedures were verified and all information found in the final version of the ER Calculation spread sheet is deemed correct. <p>A FAR has been raised associated to improving information on standard gas calibration certificates.</p> <p>f) Check of information flow The monitoring instrument transmitters convert the primary sensing signal in a signal that is hardwired transmitted to I/O cards (input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information. From the CHS database the Excel Macros transfer the data for the internal reports. The parameter is exported from the digitally available daily reports to an excel book for calculation.</p>		
Does the monitoring report (section D) correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period?	<p>ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review.</p> <p>ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information</p>	OK	OK

Data / Parameter:	V _{t,db}	Project emissions	
Data unit:	m ³ dry gas/h		
Description:	Volumetric flow of the gaseous stream in time interval t on a dry basis		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	and data relating to the monitoring of this parameter during the monitoring period.		
Conclusion	ERM CVS confirms that <ul style="list-style-type: none">• The equipment for monitoring has an appropriate accuracy and has been controlled and operated in accordance with the monitoring plan.• The calibrations have been conducted at the frequency as specified by the methodology and the monitoring plan of the registered PDD.• The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.• QA/QC procedures have been applied in accordance with the monitoring plan.		

Data / Parameter:	V _{i,t,db}	Project emissions	
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		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring equipment appropriately installed and operated and are the QA/QC procedures appropriately applied?	<p>ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan.</p> <p>a) Equipment specification PP uses a Non-dispersive infrared photometry for N₂O (TAG AT-45094C), with accuracy class: 1% of range. The equipment is found to be in line with the monitoring plan/methodology in terms of specification and accuracy.</p> <p>b) Calibration Calibration of the meter occurs every 5 years according to EN 14181 (QAL2) and an AST is performed annually. QAL3 is done on a daily basis for zero check and every other day for span by ENAEX maintenance staff. Calibration information as provided in the final version of the Monitoring Report is confirmed to be correctly reported. ERM CVS confirms that the calibrations have been undertaken as required and were valid throughout the monitoring period. The calibrations have confirmed that the equipment has performed to the required level of accuracy. In line with the requirements of EN14181, a QAL2 /26/ was conducted in November 2016 and is valid for 5</p>	OK	OK

Data / Parameter:	$V_{i,t,db}$	Project emissions	
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		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	<p>years. An AST/25/ has been done in January 2018 and January 2019. The 2018 and 2019 AST confirmed the calibration function of the 2016 QAL2, therefore all readings were considered to be correctly recalculated using the correction factors from the 2016 QAL2.</p> <p>c) Measurement/reading/recording frequency Measuring is continuous with reading every 1 seconds. Data is recorded hourly.</p> <p>d) QA/QC procedures applied The quality assurance and quality control procedures are based on the application of the requirements of EN 14181.</p> <p>e) Cross check</p> <ul style="list-style-type: none">ERM CVS has cross checked the consistency between raw data and input data in the ER calculation spreadsheet and it's used in calculations including all equipment failures reported during this monitoring period and confirm data substitution as per methodology.The verifiers went through the ER Calculation spread sheet values, and confirm that all substitutions for default value were clearly and correctly considered in line with the methodology.The verifiers checked the usage of the correction factors obtained in the QAL2/26/.The verifiers crosschecked calibration certificates (calibration internal reports). All EN 14181 procedures are implemented and recorded/25/26/. These procedures were verified and all information found in the final version of the ER Calculation spread sheet is deemed correct. <p>f) Check of information flow The monitoring instrument transmitters convert the primary sensing signal in a signal that is hardwired transmitted to I/O cards (input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information. From the CHS database the Excel Macros transfer the data for the internal reports. The parameter is exported from the digitally available daily reports to an excel book for calculation.</p>		
Does the monitoring report (section D) correctly state all relevant information and data relating to	ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review.	CAR	OK

Data / Parameter:	$V_{i,t,db}$	Project emissions	
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		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
the monitoring of this parameter during the monitoring period?	<p>A CAR was raised as during this monitoring period, several operational problems have been noted with the instrument AT-45094C. Additionally, the secondary catalyst has not been exchanged yet resulting in the reduction of its abatement capacity compared to previous monitoring periods. The DOE understands that on the one hand the readings of the instrument AT-45094C obtained during this monitoring period are not reliable and that on the other hand the abatement system has underperformed or failed during the entire monitoring period, therefore no emission reductions are eligible to be claimed during this monitoring period. The CAR was duly closed.</p> <p>ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period.</p>		
Conclusion	<p>ERM CVS confirms that</p> <ul style="list-style-type: none">• The equipment for monitoring has an appropriate accuracy and has been controlled and operated in accordance with the monitoring plan.• The calibrations have been conducted at the frequency as specified by the methodology and the monitoring plan of the registered PDD.• The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.• QA/QC procedures have been applied in accordance with the monitoring plan.		

Data / Parameter:	C _{H2O,t,db,n}	Project emissions		
Data unit:	mg H ₂ O/m ³ dry gas			
Description:	Moisture content of the gaseous stream at normal conditions in time interval t			
Measured/calculated/default	Measured (by a qualified third party)			
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK	
Is the monitoring equipment appropriately installed and operated and are the QA/QC procedures	ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan. a) Equipment specification Not applicable. The parameter is measured according to the USEPA CF42 method 4 – Gravimetric determination of water content (as set out in the applied methodology, PDD and tool)		OK	OK

Data / Parameter:	C _{H2O,t,db,n}	Project emissions	
Data unit:	mg H ₂ O/m ³ dry gas		
Description:	Moisture content of the gaseous stream at normal conditions in time interval t		
Measured/calculated/default	Measured (by a qualified third party)		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
appropriately applied?	<p>and measurements coincide with the AST /25/ done by a qualified third party.</p> <p>b) Calibration Not Applicable</p> <p>c) Measurement/reading/recording frequency Annually.</p> <p>d) QA/QC procedures applied Testing is done according to the USEPA CF42 method 4</p> <p>e) Cross check</p> <ul style="list-style-type: none">ERM has cross checked that the measurement of the moisture content have been calculated as the mean value among three consecutive measurements performed in the same day (at least 2 hours each)/25/.ERM CVS has cross checked the input parameter in the Excel spreadsheet against the results in the AST and QAL2 reports/26/25/. The moisture value in the QAL 2 and AST reports are in line with the requirements of the applied methodology and tool, and lower than the maximum values permitted. As per the methodology and tool the moisture should be less or equal to 0.05 kg H₂O/m³ dry gas so that the PP is eligible to use Option A of the Tool to Determine the Mass Flow of a Greenhouse Gas in a Gaseous Stream.ERM CVS has reviewed the values for all previous monitoring periods/6/, and confirms that historically moisture content of the gaseous stream at normal conditions were all significantly below 0.05 kg H₂O/m³ dry gas.ERM CVS confirms that, based on the results obtained, the project is eligible for Option A of the Tool to Determine the Mass Flow of a Greenhouse Gas in a Gaseous Stream. <p>f) Check of information flow The data is manually inserted in the Excel spread sheet and is generated by testing done by a qualified third party.</p>		
Does the monitoring report (section D) correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period?	<p>ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review.</p> <p>ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period.</p>	OK	OK
Conclusion	<p>ERM CVS confirms that</p> <ul style="list-style-type: none">The monitoring results have been calculated and recorded consistently as		

Data / Parameter:	C_{H2O,t,db,n}	<i>Project emissions</i>		
Data unit:	mg H ₂ O/m ³ dry gas			
Description:	Moisture content of the gaseous stream at normal conditions in time interval t			
Measured/calculated/default	Measured (by a qualified third party)			
Compliance question	Verification findings		Draft OK/ CAR/CL	Final OK/ Not OK
	per the approved frequency in the monitoring plan.			

Data / Parameter:	T _t	Project emissions	
Data unit:	K		
Description:	Temperature of the gaseous stream in time interval t		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring equipment appropriately installed and operated and are the QA/QC procedures appropriately applied?	<p>ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan.</p> <p>a) Equipment specification The temperature is measured with temperature transmitter (TAG TT-45093).The equipment is found to be in line with monitoring the plan/methodology in terms of specification and accuracy.</p> <p>b) Calibration All pieces of equipment are calibrated every 2 years. Calibration information in provided in the final version of the Monitoring Report is confirmed to be correctly reported. ERM CVS confirms that the calibrations have been undertaken as required and were valid throughout the monitoring period and, where applicable calibration delay guidance has been duly applied by PP.</p> <p>The calibrations have confirmed that the equipment has performed to the required level of accuracy.</p> <p>c) Measurement/reading/recording frequency The parameters is measured continuously with readings every 1 seconds. Data recording occurs on hourly basis.</p> <p>d) QA/QC procedures applied The quality assurance and quality control procedures, in terms of equipment operations and maintenance have been incorporated in the plants ISO 9001:2008 management system.</p> <p>e) Cross check ERM CVS has cross checked the consistency between raw data and input data in the ER calculation spreadsheet and it's used in calculations.</p>	OK	OK

Data / Parameter:	T _t	Project emissions	
Data unit:	K		
Description:	Temperature of the gaseous stream in time interval t		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	f) Check of information flow The monitoring instrument transmitters convert the primary sensing signal in a signal that is hardwired transmitted to I/O cards (input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information. From the CHS database the Excel Macros transfer the data for the internal reports. The parameter is exported from the digitally available daily reports to an excel book for calculation.		
Does the monitoring report (section D) correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period?	ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review. ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period.	OK	OK
Conclusion	ERM CVS confirms that <ul style="list-style-type: none">The equipment for monitoring has an appropriate accuracy and has been controlled and operated in accordance with the monitoring plan.The calibrations have been conducted at the frequency as specified by the methodology and the monitoring plan of the registered PDD.The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.QA/QC procedures have been applied in accordance with the monitoring plan.		

Data / Parameter:	P _t	Project emissions		
Data unit:	Pa			
Description:	Pressure of the gaseous stream in time interval t			
Measured/calculated/default	Measured			
Compliance question	Verification findings		Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring equipment appropriately installed and operated and are the	ERM CVS evaluated whether this parameter was monitored as required in the monitoring plan. a) Equipment specification		OK	OK

Data / Parameter:	P _t	Project emissions	
Data unit:	Pa		
Description:	Pressure of the gaseous stream in time interval t		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
QA/QC procedures appropriately applied?	<p>The pressure is measured by a capacitive differential pressure transmitter (TAG PT-45091), and by a capacitive barometric pressure transmitter (TAG PT-45095). Both equipment have an accuracy of 0.1% of span. The equipment are found to be in line with the monitoring plan/methodology in terms of specification and accuracy.</p> <p>b) Calibration All pieces of equipment are calibrated every month.</p> <p>Calibration information is provided in the final version of the Monitoring Report is confirmed to be correctly reported. ERM CVS confirms that the calibrations have been undertaken as required and were valid throughout the monitoring period and, where applicable, calibration delay guidance has been duly applied by PP.</p> <p>The calibrations have confirmed that the equipment has performed to the required level of accuracy.</p> <p>c) Measurement/reading/recording frequency The parameters are measured continuously with readings every 1 seconds. Data recording occurs on hourly basis.</p> <p>d) QA/QC procedures applied The quality assurance and quality control procedures, in terms of equipment operations and maintenance have been incorporated in the plants ISO 9001:2008 management system.</p> <p>e) Cross check</p> <ul style="list-style-type: none">ERM CVS has cross checked the consistency between raw data and input data in the ER calculation spreadsheet and it's used in calculations.Application of the correct equipment error in the calculation of calibration delay. <p>f) Check of information flow The monitoring instrument transmitters convert the primary sensing signal in a signal that is hardwired transmitted to I/O cards (input cards) where they are collected by DeltaV processor system. These digital values are made available via fiber optics to the DeltaV Continuous Historian Server (CHS). The CHS stores continually the information. From the CHS database the Excel Macros transfer the data for the internal reports. The parameter is exported from the digitally available daily reports to an excel book for calculation.</p>		

Data / Parameter:	P_t	Project emissions	
Data unit:	Pa		
Description:	Pressure of the gaseous stream in time interval t		
Measured/calculated/default	Measured		
Compliance question	Verification findings	Draft OK/ CAR/CL	Final OK/ Not OK
	The pressure of the gaseous stream is determined by the sum of the static pressure inside the stack and the barometric pressure the Excel file does this calculation automatically. Calibration delay corrections is manually considered in the Excel calculations sheet.		
Does the monitoring report (section D) correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period?	<p>ERM CVS reviewed the content of the monitoring report section D and evaluated its alignment with the requirements of the monitoring plan and the actual monitoring observed during the site visit and document review.</p> <p>ERM CVS confirms that the final monitoring report (section D) and Excel spread sheet correctly state all relevant information and data relating to the monitoring of this parameter during the monitoring period.</p>	OK	OK
Conclusion	<p>ERM CVS confirms that</p> <ul style="list-style-type: none"> • The equipment for monitoring has an appropriate accuracy and has been controlled and operated in accordance with the monitoring plan. • The calibrations have been conducted at the frequency as specified by the methodology and the monitoring plan of the registered PDD. • The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan. • QA/QC procedures have been applied in accordance with the monitoring plan. 		

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);• Make structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		