



Monitoring report form
(Version 05.1)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT

Title of the project activity	Catalytic N ₂ O destruction project at the new nitric acid plant PANNA 4 of Enaex S.A.	
UNFCCC reference number of the project activity	5393	
Version number of the monitoring report	Version 2	
Completion date of the monitoring report	27/04/2016	
Monitoring period number and duration of this monitoring period	Monitoring period number: 7 Duration: 01/01/2015 – 31/12/2015	
Project participant(s)	Enaex S.A. Carbon Climate Protection GmbH Mitsubishi Corporation Nordic Environment Finance Corporation	
Host Party	Republic of Chile	
Sectoral scope(s)	Sectoral scope 5: Chemical industries	
Selected methodology(ies)	ACM0019 "N ₂ O abatement from nitric acid production" (Version 02.0.0)	
Selected standardized baseline(s)	N/A	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	283 302 (365 days)	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0	45 157 (365 days)

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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1. The purpose of the proposed project activity is to significantly reduce expected levels of N_2O emissions from the production of nitric acid at the PANNA 4 plant of Enaex S.A., Chile (secondary N_2O abatement). The PANNA 4 nitric acid plant was erected in 2010 as part of the Enaex S.A. chemical complex site, Prillex® America, at Mejillones. The new nitric acid plant, designed for a capacity of 925 metric tonnes of HNO_3 per day (100% of weight), has been commercially operational since November 5th, 2010 and produces nitric acid as an intermediate product for the ammonium nitrate plant within the complex.
2. Under the project activity, a N_2O catalyst was inserted below the primary catalyst (NH_3 catalyst) in the ammonia oxidation reactor. The N_2O catalyst largely results in decomposition of N_2O to nitrogen (N_2) and oxygen (O_2) without any further energy, nor material inputs. Catalytic decomposition of N_2O occurs when the N_2O is split into its constituent elements by contact with a catalyst. A catalyst is a material which accelerates speed of the reaction without itself being transformed or consumed by the reaction.
3. The secondary N_2O abatement system was installed at the end of November 2011, with a commissioning phase of the technical equipment during the first weeks of December 2011.
4. Total emission reductions achieved in this monitoring period: **45 157 tCO₂e**

A.2. Location of project activity

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- a) Host Party(ies): Republic of Chile
- b) Province: 2nd Region (Region of Antofagasta), Province of Antofagasta
- c) Town: Mejillones
- d) GPS coordinates: -23.097400 , -70.430153



Figure 1: Location of the project within the Prillex® América Plant (green arrow)

A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
Republic of Chile (Host)	Enaex S.A.	No
Republic of Austria	Carbon Climate Protection GmbH	No
Japan	Mitsubishi Corporation	No
Norway	Nordic Environment Finance Corporation	No

A.4. Reference of applied methodology and standardized baseline

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- a) Approved consolidated baseline and monitoring methodology ACM0019 “N₂O abatement from nitric acid production” (Version 02.0.0)¹
- b) “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 03.0)²

A.5. Crediting period of project activity

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Type of the crediting period: Fixed
 Starting date of the first crediting period: 19/12/2011
 End date of the first crediting period: 18/12/2021
 Length of the first crediting period: 10 years (Fixed)

A.6. Contact information of responsible persons/entities

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 Mejillones

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 Cel: + 56 9 63339187
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ENAEX S.A. is a project participant. For further information please see Appendix 1.

¹ <http://cdm.unfccc.int/methodologies/DB/MNMFNF10VUEOJACEIRX3EHYC9QXGDC>

² <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-08-v3.0.pdf>

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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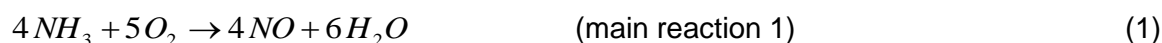
(a) Information on the implementation of the project activity

General description

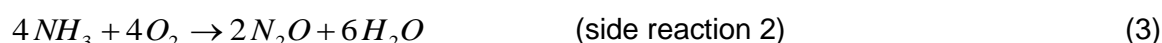
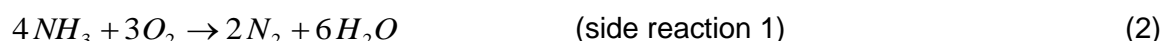
Nitrous oxide (N₂O) is an unwanted, invisible and previously neglected by-product of the manufacture of nitric acid. It is formed alongside the main, desired product nitric oxide (NO) during the catalytic oxidation of ammonia in air over noble metal gauzes. N₂O is a potent greenhouse gas with a Global Warming Potential (GWP) of 310. This value was used for the ex-ante calculation of the emission reduction (also after 2012). The production of nitric acid takes place in three main process steps as indicated by the following reactions:

1. Ammonia (NH₃) combustion to form nitric oxide (NO):

Ammonia is reacted with air on noble metal catalyst in the oxidation section of nitric acid plants. Nitric oxide and water are formed in this process according to the following equation:

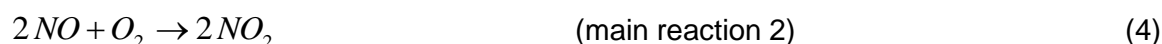


Simultaneously, nitrous oxide (N₂O), nitrogen (N) and water (H₂O) are formed as well, in accordance with the following equations:

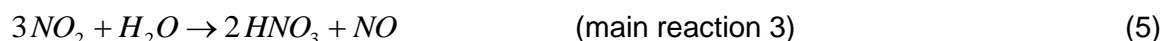


NO yield depends mainly on pressure and temperature in the ammonia oxidation process and usually is in a range of 95% to 97%.

2. NO is oxidised to nitrogen dioxide (NO₂):



3. (According to the technical process) Absorption of NO₂ in water to form nitric acid (HNO₃):



(NO is oxidised to NO₂ according to main reaction 2)

Nitric acid plants are, in the vast majority of cases, part of a chemical complex and are built and operated to supply acid for consumption in downstream process units. The most common use for nitric acid is for fertilizers, with smaller quantities going into the manufacture of organic compounds and mining explosives. In the case of PANNA 4, nitric acid is employed as a feed stock to produce ammonium nitrate (NH₄NO₃), which is used as a raw material for mining and civil explosives, which are used in the mining and construction industries. The nitric acid is also used as raw material for other explosives (PETN and Nitro-glycerine), which are also used as civil and mining explosives.

Project specific description

Under the project activity, an N₂O catalyst was inserted below the primary catalyst (NH₃ catalyst) in the ammonia oxidation reactor. The N₂O catalyst largely results in decomposition

of N_2O to nitrogen (N_2) and oxygen (O_2) without any further energy, nor material inputs. Catalytic decomposition of N_2O occurs when the N_2O is split into its constituent elements by contact with a catalyst. A catalyst is a material which accelerates speed of the reaction without itself being transformed or consumed by the reaction.

Overall reaction:



The new PANNA 4 nitric acid plant was designed to produce nitric acid as an intermediate product for the ammonium nitrate production plant in this complex with a designed capacity of 925 metric tonnes of HNO_3 per day (100% of weight). The plant is designed to operate as a dual pressure nitric acid plant, whereas the ammonia oxidation reactor is operated at a design pressure of about 4.5 bar (medium pressure combustion plant) and the absorption tower at a design pressure of 10.2 bar. The reactor is operated at a design temperature in zone 1 of 220°C, in zone 2 of 480°C, in zone 3 of 910°C and in zone 4 of 520°C.

The PANNA 4 nitric acid plant is equipped with a secondary N_2O abatement, by installing baskets inside the ammonia oxidation reactor and equipping them with the N_2O decomposition catalyst right below the platinum gauze in the high temperature zone of the reactor. The measurement devices for the monitoring of N_2O concentration and tail gas flow are located directly in the stack.

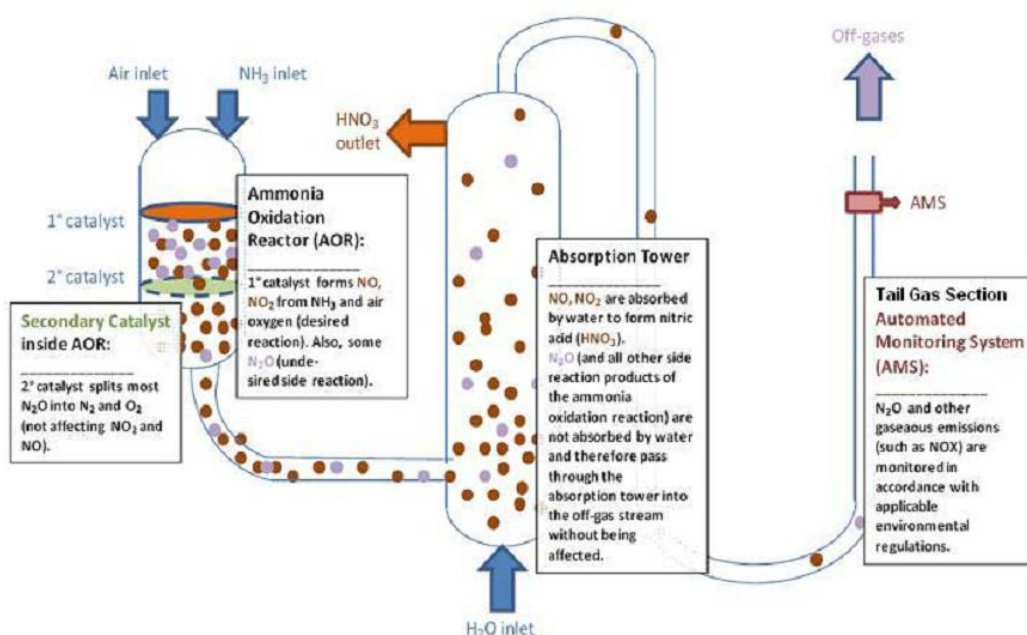


Figure 2: Project boundary

(b) Starting date of operation of the project activity

The project has been implemented and is operated as per the registered and revised PDD with all physical features (technology, project equipment, and monitoring and metering equipment) in place, monitoring is done according to the applied methodology and the monitoring plan. The operation of the project activity started in December 2011.

(c) Actual operation of the Project Activity during the covered monitoring period

It should be noted that actual hours as given in the Excel book as per Annex 1 are to be read as follows. Example: 01/01/2014 – 01:00 summarizes the hour from 01/01 00:00 am to 01:00 am. The time as given in the tables below are expressed in this regard.

Shutdown periods of the nitric acid plant

Start		End		Description
Date	Time	Date	Time	
07/01/2015	22:00	09/01/2015	01:00	Nitric Acid Plant Shutdown (28 hours)
08/02/2015	13:00	09/02/2015	07:00	Nitric Acid Plant Shutdown (19 hours)
11/02/2015	01:00	18/02/2015	01:00	Nitric Acid Plant Shutdown (169 hours)
06/05/2015	03:00	07/05/2015	01:00	Nitric Acid Plant Shutdown (23 hours)
19/06/2015	11:00	21/06/2015	04:00	Nitric Acid Plant Shutdown (42 hours)
04/08/2015	11:00	06/08/2015	12:00	Nitric Acid Plant Shutdown (50 hours)
16/10/2015	19:00	18/10/2015	03:00	Nitric Acid Plant Shutdown (33 hours)
18/10/2015	09:00	19/10/2015	02:00	Nitric Acid Plant Shutdown (18 hours)
19/10/2015	13:00	21/10/2015	02:00	Nitric Acid Plant Shutdown (38 hours)
05/11/2015	07:00	05/11/2015	21:00	Nitric Acid Plant Shutdown (15 hours)
15/11/2015	23:00	28/11/2015	22:00	Nitric Acid Plant Shutdown (312 hours)
06/12/2015	20:00	08/12/2015	23:00	Nitric Acid Plant Shutdown (52 hours)
28/12/2015	17:00	29/12/2015	23:00	Nitric Acid Plant Shutdown (31 hours)

Table 1: Shutdown periods of Nitric Acid plant

Relevant hours of Nitric Acid plant (and consequently secondary N₂O abatement system) shutdown periods have not been considered in overall calculations of Emission Reductions, in accordance with the methodology. For the respective hours no Emission Reductions will be claimed. This approach ensures the most conservative way to determine Emission Reductions, concrete resulting in zero Emission Reductions for respective hours of Nitric Acid plant shutdown.

Service works (calibration & maintenance)

Start		End		Description
Date	Time	Date	Time	
10/02/2015	01:00	10/02/2015	01:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
14/03/2015	01:00	14/03/2015	01:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
14/04/2015	00:00	14/04/2015	00:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
10/05/2015	00:00	10/05/2015	00:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
15/06/2015	01:00	15/06/2015	01:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
16/07/2015	01:00	16/07/2015	01:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
11/08/2015	00:00	11/08/2015	00:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
11/09/2015	00:00	11/09/2015	00:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
08/10/2015	00:00	08/10/2015	00:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
08/11/2015	00:00	08/11/2015	00:00	Monthly calibration PT-45091 and PT-45095 (1 hour)
19/12/2015	01:00	19/12/2015	01:00	Monthly calibration PT-45091 and PT-45095 (1 hour)

Table 2: Service works (calibration & maintenance)

During the scheduled DeltaV service, analyser service and monthly calibrations it has been proven that the nitric acid plant and consequently the secondary N₂O abatement system has been in full operation, apart from November 15th, 2015 to November 28th, 2015 when the DCS system was up-graded.

Other issues

Start		End		Description
Date	Time	Date	Time	
01/01/2015	01:00	19/02/2015	00:00	Delay in calibration TT-45093 (1 176 hours)
01/01/2015	01:00	10/02/2015	01:00	Delay in calibration PT-45091 and PT-45095 (960 hours)
09/01/2015	02:00	08/02/2015	12:00	Failure in TT-45030A (731 hours)
09/02/2015	08:00	09/02/2015	13:00	Failure in TT-45030A (6 hours)
09/02/2015	15:00	11/02/2015	00:00	Failure in TT-45030A (34 hours)
19/02/2015	17:00	19/02/2015	18:00	Failure in TT-45093 (2 hours)
10/03/2015	01:00	14/03/2015	00:00	Delay in calibration PT-45091 and PT-45095 (96 hours)
10/06/2015	01:00	15/06/2015	00:00	Delay in calibration PT-45091 and PT-45095 (120 hours)
15/06/2015	11:00	06/08/2015	12:00	Failure in PT-45091 measurement (1 250 hours)
15/07/2015	01:00	16/07/2015	00:00	Delay in calibration PT-45091 and PT-45095 (24 hours)
06/08/2015	13:00	17/08/2015	02:00	DeltaV out of service (254 hours)
07/10/2015	01:00	18/11/2015	00:00	Delay in calibration FT-45026 (1 008 hours)
18/10/2015	04:00	18/10/2015	05:00	Analyser out of service (2 hours)
21/11/2015	17:00	25/11/2015	13:00	Failure in TT-45030A, TT-45030B and TT-45030C measurement (93 hours)
08/12/2015	01:00	19/12/2015	00:00	Delay in calibration PT-45091 and PT-45095 (264 hours)

Table 3: Other issues

For relevant hours a conservative calculation in accordance with the methodology was applied.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

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No temporary deviations from registered monitoring plan or applied methodology have been applied during this monitoring period.

B.2.2. Corrections

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No corrections have been applied during this monitoring period, neither to any previous monitoring periods.

B.2.3. Changes to start date of crediting period

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No such changes have been applied to this monitoring period.

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

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No such changes have been applied to this monitoring period.

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

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No permanent changes from registered monitoring plan, applied methodology or applied standardized baseline have been applied during this monitoring period.

B.2.6. Changes to project design of registered project activity

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No changes from the project design have been done during this monitoring period.

B.2.7. Types of changes specific to afforestation or reforestation project activity

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Not applicable.

SECTION C. Description of monitoring system

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(a) Information Flow / Data collection procedures

The instruments transmitters continuously provide a 4 – 20 mA analogue signal according to range and units configured. These signals are transmitted to I/O cards (analogue input/output cards) and collected by the Delta V Processor. Resulting digital values are made available in the network to be further processed (e.g. in controller blocks, calculation of other variables) and are stored as 1 second raw data in the protected continuous historian server (CHS).

Modifications of the Delta V, which are protected by security levels by the supplier, are tracked by a Version Control Tool.

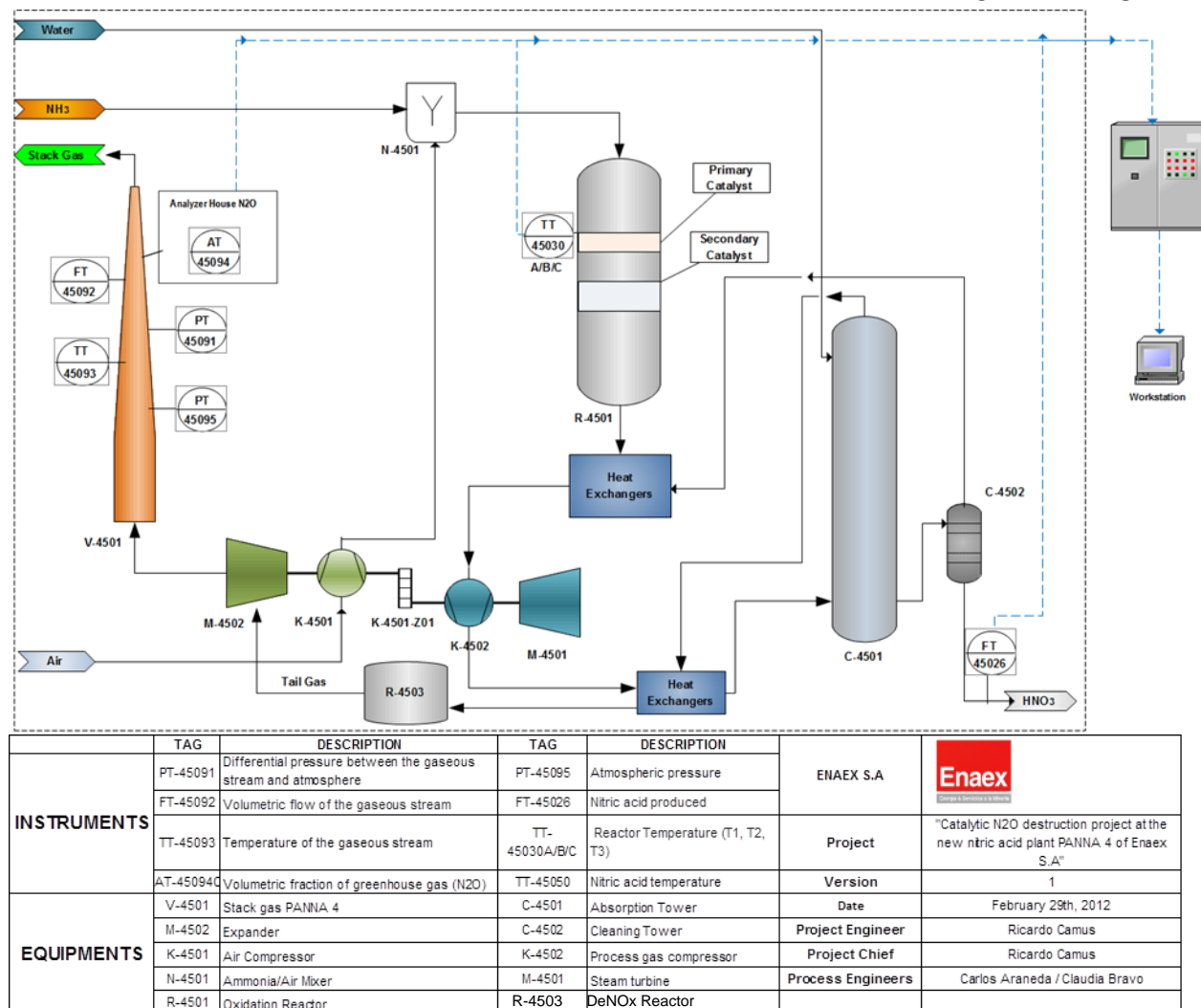


Figure 3: Line diagram showing all relevant monitoring points

The reporting module of the Delta V system automatically generates aggregated daily reports based on the stored raw data from the continuous historian server. Daily reports contain following kinds of data relevant for calculation of claimed emission reductions:

- Concentrations of N₂O at stack gas of PANNA 4 system ($v_{i,t,db}$)
- Volume Flow ($V_{t,db} / T_t / P_t$)
- Operating parameters of the nitric acid plant (T_1, T_2, T_3)
- Nitric Acid Production ($P_{production,y}$)

Relevant parameters as above (Concentrations, Volume Flows, Operating parameters of the nitric acid plant and Nitric Acid Production) are exported from the digitally available daily reports to excel sheets for presentation of required parameters and calculation of baseline emissions (BE_y), project emissions ($PE_y / PE_{N_2O,y} / F_{N_2O,tail\ gas, h}$), and emission reductions (ER_y) according to the formula as required.

The N₂O concentration at stack gas of PANNA 4 is manually recalculated using the QAL2 parameters. All values above 200 ppm are recalculated using the parameters for the range 0 – 2000 ppm and all values below use the parameters from the range 0 – 200 ppm. The range changes from 0 – 2000 ppm to 0 – 200 ppm whenever the N₂O concentration falls below 180 ppm. These changes of range are performed by the operator of DCS and takes place when the concentration reach the values mentioned above.

Details on source of data can be found directly at the respective parameter tables in *Section D*.

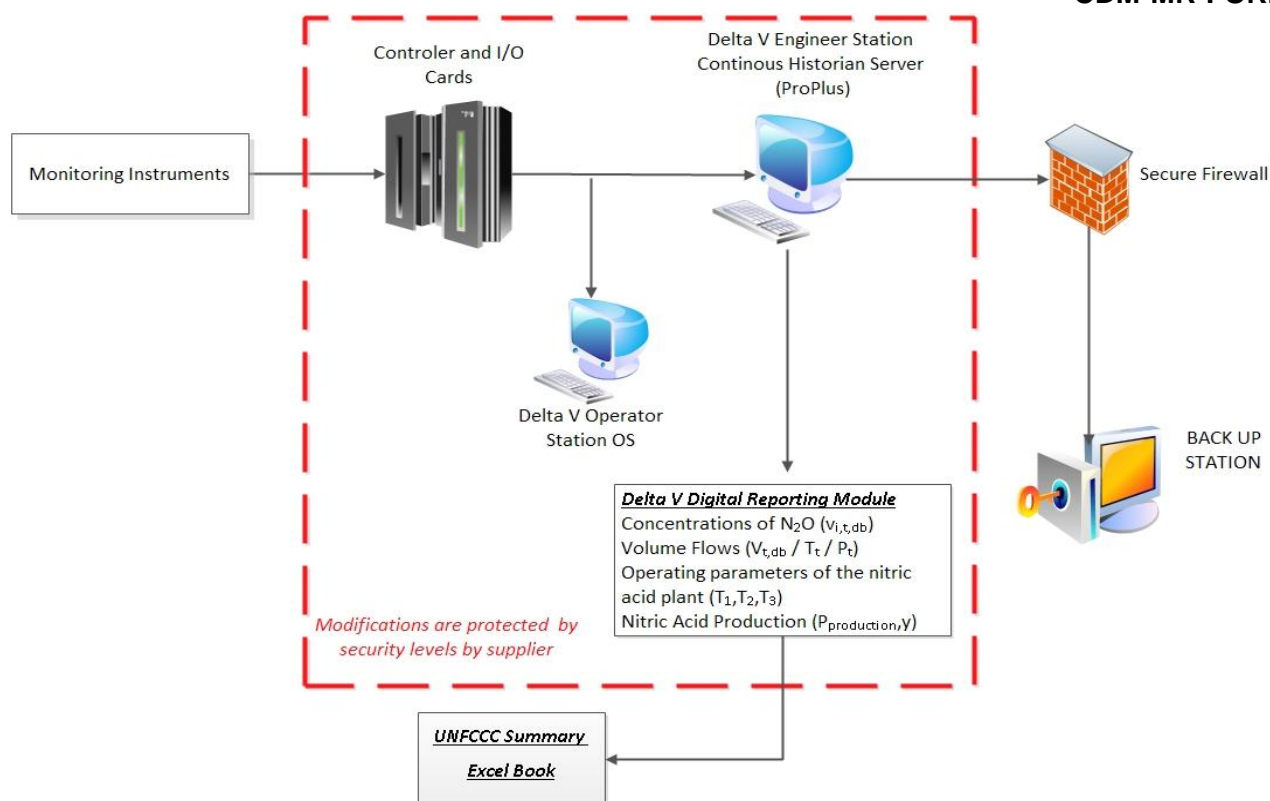


Figure 4: Information flow diagram

This approach and all implemented formulas in the Delta V system fully comply with the approved Consolidated Baseline and Monitoring Methodology AMC0019 Version 02.0.0 “N₂O abatement for Nitric Acid production” and the registered project documentation (Monitoring Plan and respective PDD).

(b) Roles and responsibilities of personnel

Project Operator is Enaex S.A. (furthermore called “Enaex”), a privately owned entity registered under the laws of the Republic of Chile and an incorporated company listed on the Santiago stock exchange, major shareholder is Sigdo Koppers S.A. Enaex is a leading producer of ammonium nitrate and explosives for rock fragmentation.

The Prillex® América production facility of Enaex, of which PANNA 4 is one of the plants, is certified according to ISO 9001:2008 NCh 9001 of 2009.

The PANNA 4 CDM operating team has been trained by the technology provider Heraeus (secondary N₂O abatement system) and the supplier of the digital process control system, INECO (Delta V, EMERSON process management).

Enaex CDM team is responsible for monitoring and reporting of data under the CDM Project. In terms of performing general supervision and cross-checks of monitoring and reporting data Carbon Climate Protection GmbH supports Enaex, also giving their final approval on the supporting documents as well as the CDM-MR before submitting to the respective DOE for periodic verification.

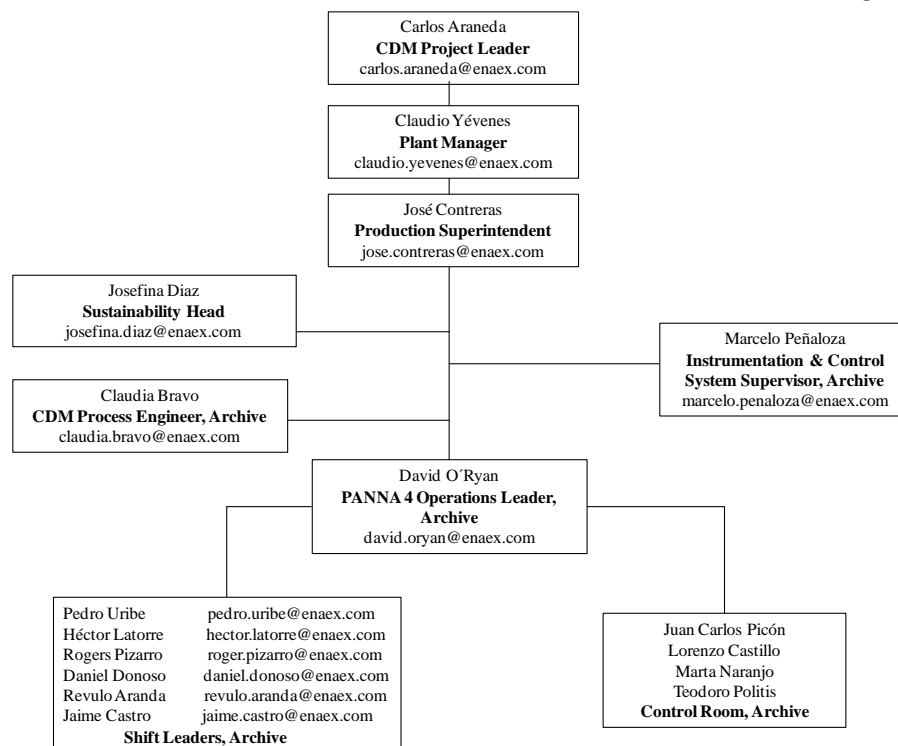


Figure 5: Organizational Chart: Onsite structure at Enaex

(c) Back up plans / Emergency procedures for monitoring system / Periodic observation of the automated monitoring system

PANNA 4 – automatic DCS system:

The PANNA 4 automatic DCS system is designed for automatic operation, so that activities by the operation personnel are not required for during normal operation. However, all alarms and any action taken by the operating personnel (events) are automatically logged at the engineering and the operation station (Alarm & Event List) of the DCS system.

Malfunction of system components is indicated on the operator console in the control room as an alarm. Occurrence of such an alarm requires the operator to immediately take measures to remedy the problem. This is done by informing Enaex maintenance personnel and CDM Project team. It is then deciding whether the problem can be fixed immediately by themselves or whether external support from Emerson is required. In addition to the quality control and quality assurance procedures according to Enaex quality management system and in order to avoid possible failures of the automated monitoring system several procedures are implemented for the project activity.

Back Up –Delta V and Analyzer support

In order to avoid possible failures of the automated monitoring system Delta V, Enaex is in negotiations to contract Emerson Argentina Group to execute periodic on-site **Health Checks**. The health checks visits are to conduct observation of the PANNA 4 automatic DCS system, the monitoring equipment required for the CDM project and the automated monitoring system.

Back Up – Weekly inspection

The responsible project managers of Enaex carry out **on-site inspections** on a weekly basis.

Back Up – Spare Parts on Stock On-site:

As a further important part of the back-up plan to deal with events like measuring equipment out of service, Enaex stocks a comprehensive range of spare part devices on-site.

Back Up – Certified standard gases:

Pressure levels of standard gases used for the regular, automatic calibration of the inlet and outlet analyzers are constantly monitored during the regular inspection by Enaex. Spare bottles of standard gases are purchased in proper time. Specifications of standard gases are available and submitted to the DOE for verification.

The following table summarizes the periodically observations of the AMS.

Organization	Action	Frequency	Output
ENAEX CDM Team	Inspection	Weekly	Weekly Checklist
ENAEX CDM Team	Supervision	Daily	Plausibility Check of Daily Reporting
CARBON	Supervision	Periodically	Plausibility Check of Daily Reporting

Table 4: AMS observation overview

All resulting documents are analyzed and evaluated by Enaex. In case of any upcoming problem or failure of the PANNA 4 system and/or the automated monitoring system Enaex immediately take measure to remedy the problem.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/parameter:	EF _{new,y}																									
Unit	kgN ₂ O/tHNO ₃																									
Description	Baseline N ₂ O emission factor for nitric acid production in year y (related to 100 per cent pure acid)																									
Source of data	According to methodology ACM0019 version 02.0.0																									
Value(s) applied)	<table><tr><th>Year</th><th>Emission factor (kgN₂O/HNO₃)</th></tr><tr><td>2011</td><td>4.10</td></tr><tr><td>2012</td><td>3.90</td></tr><tr><td>2013</td><td>3.70</td></tr><tr><td>2014</td><td>3.50</td></tr><tr><td>2015</td><td>3.40</td></tr><tr><td>2016</td><td>3.20</td></tr><tr><td>2017</td><td>3.00</td></tr><tr><td>2018</td><td>2.80</td></tr><tr><td>2019</td><td>2.70</td></tr><tr><td>2020</td><td>2.50</td></tr><tr><td>2021</td><td>2.50</td></tr></table>		Year	Emission factor (kgN ₂ O/HNO ₃)	2011	4.10	2012	3.90	2013	3.70	2014	3.50	2015	3.40	2016	3.20	2017	3.00	2018	2.80	2019	2.70	2020	2.50	2021	2.50
Year	Emission factor (kgN ₂ O/HNO ₃)																									
2011	4.10																									
2012	3.90																									
2013	3.70																									
2014	3.50																									
2015	3.40																									
2016	3.20																									
2017	3.00																									
2018	2.80																									
2019	2.70																									
2020	2.50																									
2021	2.50																									
Choice of data or measurement methods and procedures	According to the PDD / ACM0019 v2																									
Purpose of data	Baseline emission calculation																									
Additional comments	The decrease in the value for the baseline emission factor over time is to reflect the technological development.																									

Data/parameter:	GWP_{N2O}
Unit	tCO ₂ e/tN ₂ O
Description	Global warming potential of N ₂ O valid for the commitment period
Source of data	According to PDD
Value(s) applied)	298 tCO ₂ e/tN ₂ O

Choice of data or measurement methods and procedures	According to the PDD / ACM0019 v2
Purpose of data	Baseline and project emission calculation
Additional comments	The values for the GWP considers the decision of EB69 – §66 and EB69, Annex 3.

Parameters from the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”

Data/parameter:	R_u
Unit	Pa.m ³ /kmol.K
Description	Universal ideal gases constant
Source of data	According to PDD
Value(s) applied)	8,314 Pa.m ³ /kmol.K
Choice of data or measurement methods and procedures	According to the PDD / ACM0019 v2
Purpose of data	Project emission calculation
Additional comments	N/A

Data/parameter:	MM _i		
Unit	kg/kmol		
Description	Molecular mass of greenhouse gas i		
Source of data	According to PDD		
Value(s) applied)	Compound	Structure	Molecular mass (kg/kmol)
	Nitrous oxide	N ₂ O	44.02
Choice of data or measurement methods and procedures	According to the PDD / ACM0019 v2		
Purpose of data	Project emission calculation		
Additional comments	N/A		

D.2. Data and parameters monitored

Data/parameter:	P_{production,y}
Unit	tHNO ₃
Description	Production of nitric acid in year y
Measured/calculated/default	Measured
Source of data	<p>Production Logs</p> <p>The actual nitric acid production is measured according to the installed instruments. The coriolis type mass flowmeter and the integrated density measurement deliver values, which are used as basis for calculation of the concentration (taking into consideration the measured temperature of the nitric acid). The nitric acid at 100% is calculated by multiplying the mass flow with the concentration.</p> <p>Please also refer to Section C – (a) (Information Flow / Data collection procedures) of this Monitoring Report.</p>
Value(s) of monitored parameter	320 024 tHNO ₃

Monitoring equipment	<p>FT-45026 Type: Coriolis flow and density transmitter Endress Hauser Promass 80 F 3"</p> <p><u>New calibrated instrument of the same type was installed during scheduled shutdown of PANNA 4 (18/11/2015):</u></p> <p>Accuracy class: 0.15% of instrument range Calibration frequency: 2 years</p> <p>Serial number (old instrument): E8078D16000 Date of calibration (old instrument): 07/10/2013 Validity (old instrument): 06/10/2015</p> <p>Serial number (new instrument): JB037416000 Date of calibration (new instrument): 13/11/2014 Validity (new instrument): 12/11/2016</p> <p>TT-45050 Type: Temperature transmitter Inor MESO H Accuracy class: 0.1% of range Calibration frequency: 2 years</p> <p>Serial number: N0809.842183/VO336261 Date of calibration: 10/05/2014 Validity: 09/05/2016</p>
Measuring/reading/recording frequency:	<p>Measuring: Continuously Reading: 1(s) Recording: Hourly</p>
Calculation method (if applicable):	The nitric acid at 100% is calculated by multiplying the mass flow with the concentration. The concentration is calculated at DCS using the density measurement of the coriolis flowmeter and the temperature instrument TT-45050.
QA/QC procedures:	<p>Periodic calibration is performed according to manufacturer's recommendation.</p> <p>The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2008.</p>
Purpose of data:	Baseline emission calculations
Additional comments:	The parameter $P_{NA,h}$ (Nitric acid produced in the hour h) represents the hourly value of $P_{production,y}$ and is used for determining $h_{r,y}$ as described in section 5.3.3 of the applied methodology (Equation 5).

Data/parameter:	h_y
Unit	h
Description	Number of hours of operation in year y
Measured/calculated/default	Measured
Source of data	<p>Field instruments / Monitoring system (Delta V)</p> <p>The operation temperature of the oxidation burner ranges from 850 – 905°C (as defined by the technology supplier) and this range corresponds to the real operation hours of the reactor. The temperature is reported automatically by three independent measurement points (tag numbers TT-45030A, B and C) measuring the temperature at the same time. The value of the instrument with the tag number TT-45030A was selected as main signal for monitoring the operation temperature; TT-45030B and TT-45030C are used as backup signals in case TT-45030A is not fully functional.</p>
Value(s) of monitored parameter	7 676 hours

Monitoring equipment	<p>TT-45030A Type: Temperature transmitter Wika TC10 Type B</p> <p><u>New calibrated instrument of the same type was installed during scheduled shutdown of PANNA 4 (19/11/2015):</u></p> <p>Accuracy class: 0.4% of range Calibration frequency: 2 years</p> <p>Serial number (old instrument): 1104NO00 Date of calibration: 12/08/2014 Validity (old instrument): 11/08/2016</p> <p>Serial number (new instrument): 1104NC51 Date of calibration (new instrument): 19/11/2015 Validity (new instrument):18/11/2017</p> <p>TT-45030B Type: Temperature transmitter Wika TC10 Type B</p> <p><u>New calibrated instrument of the same type was installed during scheduled shutdown of PANNA 4 (19/11/2015):</u></p> <p>Accuracy class: 0.4% of range Calibration frequency: 2 years</p> <p>Serial number (old instrument): 1104NC5E Date of calibration: 12/08/2014 Validity (old instrument): 11/08/2016</p> <p>Serial number (new instrument): 1107GTB8 Date of calibration (new instrument): 19/11/2015 Validity (new instrument):18/11/2017</p> <p>TT-45030C Type: Temperature transmitter Wika TC10 Type B</p> <p><u>New calibrated instrument of the same type was installed during scheduled shutdown of PANNA 4 (19/11/2015):</u></p> <p>Accuracy class: 0.4% of range Calibration frequency: 2 years</p> <p>Serial number (old instrument): 1104NC5D Date of calibration: 12/08/2014 Validity (old instrument): 11/08/2016</p> <p>Serial number (new instrument): 1107GTB6 Date of calibration (new instrument): 19/11/2015 Validity (new instrument):18/11/2017</p>
Measuring/reading/recording frequency:	Measuring: Continuously Reading: 1(s) Recording: Hourly
Calculation method (if applicable):	N/A

QA/QC procedures:	Periodic calibration is performed according to manufacturer's recommendation. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2008.
Purpose of data:	Project emission calculation
Additional comments:	NA

Data/parameter:	$h_{r,y}$
Unit	h
Description	Number of hours (h) in year y where for secondary N ₂ O abatement: abatement system was not installed, underperformed or failed
Measured/calculated/default	Measured
Source of data	Since the proposed project activity didn't use AM0028 or AM0034 in the first crediting period, "Case 2: For other nitric acid plants" applies for the emission reduction calculation. Accordingly the abatement system is deemed to be not installed, underperforming or failed in the hour h in year y if: $F_{N2O,tail\ gas,h} > EF_{new,y} * P_{NA,h}$
Value(s) of monitored parameter	3 449 hours
Monitoring equipment	The parameters mentioned above will be determined and monitored as explained in the respective sections of this Monitoring Report ($F_{N2O,tail\ gas,h} \rightarrow$ Parameter tables of " <i>Tool to determine the mass flow of a greenhouse gas in a gaseous stream</i> "; $EF_{new,y} \rightarrow$ fixed ex ante; $P_{NA,h} \rightarrow$ Parameter table of $P_{production,y}$).
Measuring/reading/recording frequency:	Measuring: Continuously Reading: 1(s) Recording: Hourly
Calculation method (if applicable):	N/A
QA/QC procedures:	Periodic calibration is performed according to manufacturer's recommendation. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2008.
Purpose of data:	Project and baseline emission calculation
Additional comments:	Records to be maintained during project's lifetime.

Parameters from the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"

Data/parameter:	$V_{t,db}$
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
Source of data	Flow meter / Field instruments/Monitoring system (Delta V) Please also refer to Section C – 1 (Information Flow / Data collection procedures) of this Monitoring Report.
Value(s) of monitored parameter	173 809 m ³ dry gas/h

Monitoring equipment	FT-45092 Type: Differential pressure transmitter Durag/ABB 2600T Accuracy class: 2% of range Serial number: 265DS6600071043 Calibration frequency: 3 years (QAL2) Date of last calibration (QAL2): 25/10/2013 Validity: 24/10/2016 Date of penultimate AST Test: 12/11/2014 – 13/11/2014 Date of last AST Test: 16/12/2015 – 18/12/2015 Validity: 15/12/2016
Measuring/reading/recording frequency:	Measuring: Continuously Reading: 1(s) Recording: Hourly
Calculation method (if applicable):	N/A
QA/QC procedures:	Periodic calibration (QAL2) against a primary device by an independent accredited laboratory. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2008.
Purpose of data:	Project emission calculations
Additional comments:	N/A

Data/parameter:	V_{i,t,db}
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
Source of data	Non-dispersive infrared photometry (NDIR) for N ₂ O (Gas analyzer equipment) Please also refer to <i>Section C – 1 (Information Flow / Data collection procedures)</i> of this Monitoring Report.
Value(s) of monitored parameter	5.79*10 ⁻⁴ m ³ gas i/m ³ dry gas
Monitoring equipment	AT-45094C Type: Volumetric fraction of N ₂ O in the tail gas analyser Emerson Process NGA 2000 MLT Accuracy class: 1% of range Serial number: 3709103038248 Calibration frequency: 3 years (QAL2) Date of last calibration (QAL2): 25/10/2013 Validity: 24/10/2016 Date of penultimate AST Test: 12/11/2014 – 13/11/2014 Date of last AST Test: 16/12/2015 – 18/12/2015 Validity: 15/12/2016
Measuring/reading/recording frequency:	Measuring: Continuously Reading: 1(s) Recording: Hourly
Calculation method (if applicable):	N/A
QA/QC procedures:	According to European Norm 14181 The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2008
Purpose of data:	Project emission calculation
Additional comments:	N/A

Data/parameter:	C_{H2O,t,db,n}
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
Source of data	Measurements according to USEPA CF 42 method 4 – Gravimetric determination of water content (QAL2 Report) Date of penultimate determination (AST): 12/11/2014 – 13/11/2014 Date of last determination (AST): 16/12/2015 – 18/12/2015 Next determination until: 15/12/2016
Value(s) of monitored parameter	2 200 mg H ₂ O/m ³ dry gas (Highest measured value) Option A of the tool can be applied, as the moisture content is less than 0.05 kg H ₂ O/m ³ dry gas.
Monitoring equipment	N/A
Measuring/reading/recording frequency:	Measuring / Reading / Recording: Yearly Measurements will coincide with the Annual Surveillance Test (associated with requirements of the EN 14181 standard) or the calibration of the flow meter for the gaseous stream.
Calculation method (if applicable):	N/A
QA/QC procedures:	According to USEPA CF 42 method 4
Purpose of data:	Project emission calculation
Additional comments:	Option A parameter for proving that the gaseous stream is dry.

Data/parameter:	T_t
Unit	K
Description	Temperature of the gaseous stream in time interval t
Measured/calculated/default	Measured
Source of data	Temperature Transmitter Please also refer to Section C – 1 (Information Flow / Data collection procedures) of this Monitoring Report.
Value(s) of monitored parameter	387.08 K
Monitoring equipment	TT-45093 Type: Tail gas temperature transmitter Rosemount 3144P Accuracy class: 0.4 °C Serial number: 706088 Calibration frequency: 2 years Date of penultimate calibration: 22/08/2012 Date of last calibration: 19/02/2015 Validity: 18/02/2017
Measuring/reading/recording frequency:	Measuring: Continuously Reading: 1(s) Recording: Hourly
Calculation method (if applicable):	N/A
QA/QC procedures:	Periodic calibration against a primary device provided by an independent accredited laboratory. Calibration and frequency of calibration is according to manufacturer's specifications. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2008.

Purpose of data:	Project emission calculation
Additional comments:	N/A

Data/parameter:	P_t																																																
Unit	Pa																																																
Description	Pressure of the gaseous stream in time interval t																																																
Measured/calculated/default	Measured																																																
Source of data	Pressure Transmitters The pressure of the gaseous stream is determined by the sum of the static pressure inside the stack and the barometric pressure. Please also refer to Section C – 1 (Information Flow / Data collection procedures) of this Monitoring Report.																																																
Value(s) of monitored parameter	100 216 Pa																																																
Monitoring equipment	<p>PT-45091 Type: Capacitive Differential pressure transmitter Rosemount 2051 Accuracy class: 0.1% of range Serial number: 58154 Calibration frequency: Monthly Date of calibration:</p> <table border="1"> <thead> <tr> <th>Month</th><th>Date of Calibration</th></tr> </thead> <tbody> <tr><td>February</td><td>10/02/2015</td></tr> <tr><td>March</td><td>14/03/2015</td></tr> <tr><td>April</td><td>14/04/2015</td></tr> <tr><td>May</td><td>10/05/2015</td></tr> <tr><td>June</td><td>15/06/2015</td></tr> <tr><td>July</td><td>16/07/2015</td></tr> <tr><td>August</td><td>11/08/2015</td></tr> <tr><td>September</td><td>11/09/2015</td></tr> <tr><td>October</td><td>08/10/2015</td></tr> <tr><td>November</td><td>08/11/2015</td></tr> <tr><td>December</td><td>19/12/2015</td></tr> </tbody> </table> <p>Validity: 18/01/2016</p> <p>PT-45095 Type: Capacitive Barometric pressure transmitter Rosemount 2051 Accuracy class: 0.1% of range Serial number: 58157 Calibration frequency: Monthly Date of calibration:</p> <table border="1"> <thead> <tr> <th>Month</th><th>Date of Calibration</th></tr> </thead> <tbody> <tr><td>February</td><td>10/02/2015</td></tr> <tr><td>March</td><td>14/03/2015</td></tr> <tr><td>April</td><td>14/04/2015</td></tr> <tr><td>May</td><td>10/05/2015</td></tr> <tr><td>June</td><td>15/06/2015</td></tr> <tr><td>July</td><td>16/07/2015</td></tr> <tr><td>August</td><td>11/08/2015</td></tr> <tr><td>September</td><td>11/09/2015</td></tr> <tr><td>October</td><td>08/10/2015</td></tr> <tr><td>November</td><td>08/11/2015</td></tr> <tr><td>December</td><td>19/12/2015</td></tr> </tbody> </table> <p>Validity: 18/01/2016</p>	Month	Date of Calibration	February	10/02/2015	March	14/03/2015	April	14/04/2015	May	10/05/2015	June	15/06/2015	July	16/07/2015	August	11/08/2015	September	11/09/2015	October	08/10/2015	November	08/11/2015	December	19/12/2015	Month	Date of Calibration	February	10/02/2015	March	14/03/2015	April	14/04/2015	May	10/05/2015	June	15/06/2015	July	16/07/2015	August	11/08/2015	September	11/09/2015	October	08/10/2015	November	08/11/2015	December	19/12/2015
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Calculation method (if applicable):	The static pressure inside the stack and the barometric pressure are measured continuously. The hourly averages of these parameters are added in the attached excel book in order to obtain the pressure of the gaseous stream.
QA/QC procedures:	Periodic calibration against a primary device provided by an independent accredited laboratory. Calibration and frequency of calibration is according to manufacturer's specifications. Pressure transmitter will be calibrated according to the PDD on a monthly basis. The quality assurance and quality control procedures, in terms of equipment operations and maintenance, have been incorporated in the ISO 9001:2008.
Purpose of data:	Project emission calculation
Additional comments:	N/A

D.3. Implementation of sampling plan

>>

Not applicable for the project activity.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

Baseline emissions are given by the following equation:

$$BE_y = P_{production,y} * EF_{new,y} * \frac{(h_y - h_{r,y})}{h_y} * GWP_{N_2O} * 10^{-3}$$

Where:

BE_y	=	Baseline emissions in year y (tCO ₂ e)
$P_{production,y}$	=	Production of nitric acid in year y (tHNO ₃)
$EF_{new,y}$	=	Baseline N ₂ O emission factor for nitric acid production in year y (kgN ₂ O / tHNO ₃)
GWP_{N_2O}	=	Global Warming Potential of N ₂ O valid for the commitment period
h_y	=	Number of hours in year y during which the plant was in operation (h)
$h_{r,y}$	=	Number of hours in year y where: <ul style="list-style-type: none"> (a) For secondary N₂O abatement. Abatement system was not installed, underperforming or failed. (b) For tertiary N₂O abatement. The abatement system is bypassed, underperformed or failed.

Calculation of $h_{r,y}$

An abatement system is deemed to be bypassed, not working, underperform or failed in the hour h in year y if:

$$F_{N_2O,tail\ gas,h} > EF_{new,y} * P_{NA,h}$$

Where:

$P_{NA,h}$	=	Nitric acid produced in the hour h (t HNO ₃)
$EF_{new,y}$	=	Baseline N ₂ O emission factor for nitric acid production in year y (kg N ₂ O/t HNO ₃)
$F_{N_2O,tail\ gas,h}$	=	Mass flow of N ₂ O in the gaseous stream of the tail gas in the hour h

(kg N₂O/h)

The values for the present period are:

Parameter	Value	Unit
BE _y	178 556	tCO ₂ e
P _{production,y}	320 024	tHNO ₃
EF _{new,y}	3.40	kgN ₂ O / tHNO ₃
h _y	7 676	h
h _{r,y}	3 449	h
GWP _{N2O}	298	-

E.2. Calculation of project emissions or actual net GHG removals by sinks

>>

Project emissions include N₂O emissions, which have not been destroyed by the project activity and, in case of the installation of a tertiary N₂O abatement facility, CO₂ emissions resulting from the operation of the N₂O abatement facility. As the proposed CDM project activity does not comprise the installation of a tertiary N₂O abatement technology, no CO₂ emissions from the operation of such a facility need to be considered or monitored.

Project emissions are calculated as follows:

$$PE_y = PE_{N2O,y} + PE_{CO2,tertiary,y}$$

Where:

PE _y	=	Project emissions in year y (tCO ₂ e)
PE _{N2O,y}	=	Project emissions of N ₂ O from the project plant in year y (tCO ₂ e)
PE _{CO2,tertiary,y}	=	Project emissions of CO ₂ from the operation of the tertiary N ₂ O abatement facility in year y (tCO ₂ e)

The values for the present period are:

Parameter	Value	Unit
PE _y	133 399	tCO ₂ e
PE _{N2O,y}	133 399	tCO ₂ e
PE _{CO2,tertiary,y}	0	tCO ₂ e

Project emissions of N₂O from the project plant (PE_{N2O,y})

- a) The amount of N₂O emissions from the project activity are the emissions from the N₂O contained in the tail gas stream of the plant which is released to the atmosphere.

Accordingly, PE_{N2O,y} is determined as follows:

$$PE_{N2O,y} = \sum_1^{h_y - h_{r,y}} F_{N2O,tail\ gas, h} * GWP_{N2O} * 10^{-3}$$

Where:

PE _{N2O,y}	=	Project emissions of N ₂ O from the project plant in year y (tCO ₂ e)
GWP _{N2O}	=	Global Warming Potential of N ₂ O valid for the commitment period
F _{N2O,tail gas,h}	=	Mass flow of N ₂ O in the gaseous stream of the tail gas in the hour h (kg N ₂ O/h)
h _y	=	Number of hours in year y during which the plant was in operation (h)
h _{r,y}	=	Number of hours (h) in year y where:

- (a) For secondary N₂O abatement. Abatement system was not installed, underperforming or failed;
- (b) For tertiary N₂O abatement. The abatement system is bypassed, underperforming or failed.

The values for the present period are:

Parameter	Value	Unit
PE _{N₂O,y}	133 399	tCO ₂ e
h _y	7 676	h
h _{r,y}	3 449	h
F _{N₂O,tail gas,h}	141.38	kg N ₂ O/h
GWP _{N₂O}	298	-

Determination of F_{N₂O,tail gas,h}

The amount of N₂O emissions from the tail gas stream of the project plant shall be determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”. In applying the tool, the following provisions apply:

- Throughout the crediting periods of the project activity, the N₂O concentration and volume or mass flow of the tail gas are to be monitored continuously. The monitoring system is to be installed and maintained throughout the crediting period based on the European Norm 14181 (2004), or any more recent update of that standard;
- The monitoring system should provide separate hourly average values for the N₂O concentration and the volume or mass flow of the tail gas based on 2 seconds (or shorter) interval readings that are recorded and stored electronically. These N₂O data sets shall be identified by means of a unique time / date key indicating when exactly the values were observed;
- The correction factors derived from the calibration curve of the QAL2 audit for the monitoring components as determined during the QAL2-test in accordance with EN14181 must be applied to both the N₂O concentration and the volume or mass flow of the tail gas. This can either be applied automatically to the raw data recorded by the data storage system at the plant or it can be applied to the calculated hourly averages as part of the calculation of project emissions;
- 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 shut-down shall not be used for the determination of the maximum values;
- In the case that the N₂O concentration and the volume or mass flow of the tail gas and bypass are automatically converted to normal conditions by the AMS during the monitoring process, the parameters P_t and T_t do not need to be monitored except, if applicable, for the purpose of determining the moisture content in the gaseous stream.

According to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 03.0) the mass flow of greenhouse gas i in the gaseous stream in time interval t (F_{i,t}) is calculated based on measurements of (a) the total volume flow or mass flow of the gas stream, (b) the volumetric fraction of the gas in the gaseous stream and (c) the gas composition and water content. The flow and volumetric fraction may be measured on a dry basis or wet basis. The tool covers the possible measurement combinations, providing six different calculation options to determine the mass flow of a particular greenhouse gas (Option A to F).

Flow measurement on a dry basis is not doable for a wet gaseous stream. Therefore, it is necessary to demonstrate that the gaseous stream is dry to use option A. There are two ways to do this:

- Measure the moisture content of the gaseous stream ($C_{H_2O,t,db,n}$) and demonstrate that this is less or equal to 0.05 kg H₂O/m³ dry gas; or
- Demonstrate that the temperature of the gaseous stream (T_t) is less than 60°C (333.15 K) at the flow measurement point.

Option A of the tool (measurement options: volume flow of gaseous stream on dry basis, volumetric fraction on dry or wet basis) was applied, since it was demonstrated by QAL 2 Report, which was performed by AIRTEC in October 2013, and by the last AST performed in December 2015, that the gaseous stream is dry according to USEPA CF42 method 4. The measured moisture content in the stack gas is less than 0.05 kg/m³ dry gas. It is important to note that the reason for the delayed performance of the AST in December 2015 (penultimate test was performed in November 2014) corresponds only to the coordination and scheduling by AIRTEC.

Table 4: Moisture content measurements (according to AST report)

Measuring Sequence	Date	Moisture content
1	17/12/2015	0.0020 kgH ₂ O/m ³ dry gas
2	18/12/2015	0.0022 kgH ₂ O/m ³ dry gas
3	18/12/2015	0.0020 kgH ₂ O/m ³ dry gas

The mass flow of greenhouse gas i ($F_{i,t}$)³ is calculated as follows:

$$F_{i,t} = V_{t,db} * v_{i,t,db} * \rho_{i,t}$$

With

$$\rho_{i,t} = \frac{P_t * MM_i}{R_u * T_t}$$

Where:

$F_{i,t}$	=	Mass flow of greenhouse gas i in the gaseous stream in time interval t (kg gas/h)
$V_{t,db}$	=	Volumetric flow of the gaseous stream in time interval t on a dry basis (m ³ dry gas/h)
$v_{i,t,db}$	=	Volumetric fraction of greenhouse gas i in the gaseous stream in a time interval t on a dry basis (m ³ gas i/m ³ dry gas)
$\rho_{i,t}$	=	Density of greenhouse gas i in the gaseous stream in time interval t (kg gas i/m ³ gas)
P_t	=	Absolute pressure of the gaseous stream in time interval t (Pa)
MM_i	=	Molecular mass of greenhouse gas i (kg/kmol)
R_u	=	Universal ideal gases constant (Pa.m ³ /kmol.K)
T_t	=	Temperature of the gaseous stream in time interval t (K)

For detailed calculation please refer to excel book in the Annex of this monitoring report.

E.3. Calculation of leakage

>>

According to the methodology any leakage emissions sources are deemed to be negligible.

³ $F_{i,t}$ corresponds to the parameter $F_{N_2O,tail\ gas,h}$ of the methodology ACM0019 Version 02.0.0.

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	178 556	133 399	0	0	45 157	45 157

^{y)} Note that actual calculation of emissions reductions as presented in chapter E1 to E4 has been done in the excel book. Rounding in chapters E1 to E4 has just been done for ease of presentation. Please note that conservative rounding has been made for final ER_y calculation only. This can be traced in the excel book attached to this monitoring report.

E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	283 302 (365 days)	45 157 (365 days)

E.6. Remarks on difference from estimated value in registered PDD

>>

The emission reductions in this Monitoring Period are 45 157 tons of CO₂ equivalents. The yearly expected emission reduction according to the registered PDD is 283 302 tons of CO₂ equivalents. This corresponds to emission reductions equivalents in 365 days, proportionally to each year; hence the observed emission reduction is lower than expected.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project Participant <input checked="" type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Enaex S.A.
Street/P.O. Box	Renato Sánchez # 3859, Las Condes
Building	
City	Santiago
State/region	Región Metropolitana
Postcode	7550282
Country	Chile
Telephone	+56-2-8377600
Fax	+56-2-2066752
E-mail	
Website	www.enaex.cl
Contact person	Josefina Diaz Fresno
Title	Project Manager
Salutation	Ms.
Last name	Diaz Fresno
Middle name	
First name	Josefina
Department	
Mobile	+56-9-93465064
Direct fax	+56-2-2066752
Direct tel.	+56-2-8377648
Personal e-mail	josefina.diaz@enaex.com

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project Participant <input type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Carbon Climate Protection GmbH
Street/P.O. Box	Am Südblick 5/2
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City	Langenlois
State/Region	
Postcode	A-3550
Country	Austria
Telephone	+43 2734 322 70
Fax	+43 2734 322 70 99
E-mail	
Website	www.carbon-austria.com
Contact person	Mr. Ferdinand Heilig
Title	Project Manager
Salutation	Mr.
Last name	Heilig

Middle name	
First name	Ferdinand
Department	
Mobile	+43 676 6259415
Direct fax	+43 2734 322 70 99
Direct tel.	+43 2734 322 70 70
Personal e-mail	bichler@carbon-austria.com

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project Participant <input type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Mitsubishi Corporation
Street/P.O. Box	3-1 Marunouchi 2-Chome, Chiyoda-Ku
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City	Tokyo
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Country	Japan
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Appendix 2. Emission reduction calculation

An Excel book containing monitored data and calculations of baseline emissions, project emissions and emission reductions and additional checks and information is attached:

MP 7_PANNA 4 (5393)_UNFCCC SUMMARY_v2_Confidential

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

Decision Class: Regulatory
 Document Type: Form
 Business Function: Issuance
 Keywords: monitoring report