# 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** | "N2O Emission Reduction in Nitric Acid Plant Paulínia, SP, Brazil" | |
| **UNFCCC reference number of the project activity** | UNFCCC 1011 | |
| **Version number of the monitoring report** | 1.0 | |
| **Completion date of the monitoring report** | 05/09/2016 | |
| **Monitoring period number and duration of this monitoring period** | Monitoring period #11<br>28/07/2015 to 27/07/2016 (366 days) | |
| **Project participant(s)** | 1. Rhodia Energy Brazil Ltda.<br>2. Rhodia Energy GHG<br>3. Rhodia Energy GHG SAS<br>4. Nordic Environment Finance Corporation | |
| **Host Party** | Brazil | |
| **Sectoral scope(s)** | Category 5: Chemical Industry | |
| **Selected methodology(ies)** | "Large-scale Consolidated Methodology - N2O abatement from nitric acid production (ACM0019 - Version 02.0)" | |
| **Selected standardized baseline(s)** | | |
| **Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD** | 71,364 tCO2e | |
| **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 | 50,229 |

# SECTION A. Description of project activity

## A.1. Purpose and general description of project activity

Nitrous oxide ($N_2O$) is a by-product of nitric acid production. It is of low toxicity but is a greenhouse gas (GHG), whose GWP is large (GWP=298 considering EB69/Annex3). Emissions of $N_2O$ are controlled under the Kyoto Protocol. There are no national or regional regulations or restrictions on the emission of $N_2O$ in Brazil. There are in fact no governmental regulations with quantified emission limits in any non-Annex I countries at this point.

In this project, a secondary catalyst was installed inside the ammonia burner of the nitric acid plant of Paulínia for the reduction of $N_2O$ emissions which would otherwise be released to the atmosphere if the project were not implemented.
The $N_2O$ reduction catalyst was installed in the factory site of Paulínia Rhodia Poliamida e Especialidades Ltda. in July 2007 and the first project campaign started on 28/07/2007.

The unit operates continuously but needs to be stopped periodically (typically every 6 to 9 months) in order to replace the primary catalyst Pt gauzes. The period between two technical shutdowns is referred to as a "campaign".

The baseline campaign took place from 15/09/2006 to 13/04/2007 before the installation of the secondary catalyst.

This monitoring report covers the $11^{th}$ monitoring period from 28/07/2015 to 27/07/2016. The emission reductions achieved during this period are: 50,229 tCO2e

Regarding the technical aspects of this project follows below a brief description of the process used for N2O abatement and of the installed technology and equipment:

The basic Ostwald process involves 3 chemical steps:

A) Catalytic oxidation of ammonia with atmospheric oxygen, to yield Nitrogen Monoxide (or Nitric Oxide).
(1) $4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$

B) Oxidation of the Nitrogen Monoxide to Nitrogen Dioxide or Dinitrogen Tetroxide
(2) $2\ NO + O_2 \rightarrow 2\ NO_2 \leftrightarrow N_2O_4$

C) Absorption of the Nitrogen Oxides with water to yield Nitric Acid
(3) $3\ NO_2 + H_2O \rightarrow 2\ HNO_3 + NO$

Reaction 1 is favored by lower pressure and higher temperature. Nevertheless, at too high temperature, secondary reactions take place that lower the yield (affecting the nitric acid production); then, an optimal temperature is found at 850-950 $^oC$, affected by other process conditions and catalyst chemical composition.

Reactions 2 and 3 are favored by higher pressure and lower temperatures.
The way in which these three steps are implemented, characterizes the various Nitric Acid processes found throughout the industry. In single pressure processes (the case of the Paulínia plant) ammonia combustion and nitrogen oxide absorption take place at the same working pressure. In dual pressure or split pressure plants the absorption pressure is higher than the ammonia combustion pressure.

**Nitrous Oxide formation**

Nitrous oxide is formed during the catalytic oxidation of Ammonia. Over a suitable catalyst, typically 90-99% of the fed Ammonia is converted to Nitric Oxide (NO) according to reaction (1) above. The remainder participates in undesirable side reactions that lead to Nitrous Oxide ($N_2O$), among other compounds.

Possible side reactions during oxidation of Ammonia:
(4) $4\ NH_3 + 4\ O_2 \rightarrow 2\ N_2O + 6\ H_2O$ (Nitrous Oxide formation).
(5) $4\ NH_3 + 3\ O_2 \rightarrow 2\ N_2 + 6\ H_2O$
(6) $2\ NO \rightarrow N_2 + O_2$
(7) $4\ NH_3 + 6\ NO \rightarrow 5\ N_2 + 6\ H_2O$

**$N_2O$ abatement technology classification**

The potential technologies (proven and under development) to treat $N_2O$ emissions at Nitric acid plants have been classified as follows, based on the location of the treatment device:

- Primary: $N_2O$ is prevented from forming in the ammonia oxidation gauzes.
- Secondary: $N_2O$ once formed, is eliminated anywhere between the outlet of the ammonia oxidation gauzes and the inlet of the absorption tower.
- Tertiary: $N_2O$ is removed at the tail gas, after the absorption tower and before the expansion turbine.
- Quaternary: $N_2O$ is reduced after the expansion turbine, and before the stack.

**Selected technology for the project**

The technology applied at Paulínia nitric acid plant involves the addition of a new catalyst inside the ammonia burner ("secondary catalyst"), located just below (downstream) the oxidation gauzes with the purpose of decomposing $N_2O$.

This choice has several advantages:

- The secondary catalyst does not consume any electricity, steam, fuels or reducing agents (all sources of leakage) to eliminate $N_2O$ emissions. Therefore, operating costs are limited to the cost of the catalyst itself.
- The installation is simple and does not require the addition of new process equipment or the re-design of existing ones. The main investment is the measuring equipment needed to monitor the emissions (analyzer, flow meter, etc.).
- The installation of the secondary catalyst can be done during the periodic shutdown needed to change the primary gauze thus avoiding an additional downtime of the unit.
- This "secondary catalyst" decomposes $N_2O$ without affecting the Nitric Acid production. Typically the secondary catalyst has a very high activity for $N_2O$ decomposition in a typical medium pressure plant with more than 80% of $N_2O$ reduction achieved. No additional greenhouse gases or other emissions are generated by the reactions on the $N_2O$ abatement catalyst.

The Nitric Acid Plant at Paulínia uses a basket structure supporting the primary catalytic Pt gauzes used for the ammonia oxidation. In order to make room for the new catalyst, a few layers of inert rings were removed from the basket and replaced by the active secondary catalyst pellets. Once the secondary catalyst is installed, the primary gauzes are placed on top of the basket as usual. The secondary catalyst acts then like a support just downstream of the primary gauzes.
The $N_2O$ abatement catalyst supplier is obliged by contract to take back the used catalyst at the end of its lifetime and to recycle it after regeneration.

## A.2. Location of project activity

Host Party: Brazil
State: São Paulo
City: Paulínia
GPS coordinates: -22.753611 -47.158889

### 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) |
|---|---|---|
| Brazil (host) | Private entity : Rhodia Energy Brazil Ltda. | No |
| France | Private entity: Rhodia Energy GHG SAS | No |
| Switzerland | Private entity: Rhodia Energy GHG SAS | No |
| Norway | Private entity : Nordic Environment Finance Corporation | No |

### A.4. Reference of applied methodology and standardized baseline

- Large-scale Consolidated Methodology “N2O abatement from nitric acid production” (ACM0019, V 02.0)
- Methodological Tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (V 03.0.1 / EB 66 Annex 47)
- Tool to determine the mass flow of a greenhouse gas in a gaseous stream (V 02)
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (V 02)
- Project Design Document:
  N2O Emission Reduction in nitric acid plant Paulínia, SP, Brazil Version 8 dated 13/01/2014

### A.5. Crediting period of project activity

The length of the crediting period is 21 years (renewable 3*7 years).
The second crediting period (on-going) is from 28/07/2014 to 27/07/2021.

### A.6. Contact information of responsible persons/entities

Entity: Solvay Energy Services:

- Mr João Luiz Alves da Costa, CO2 Operations Coordinator, joaoluiz.costa@solvay.com
- Mr Philippe Chevallier, CO2 Operations Team Leader, philippe.chevallier@solvay.com

# SECTION B. Implementation of project activity

## B.1. Description of implemented registered project activity

The baseline campaign took place from 15/09/2006 to 13/04/2007 before the installation of the secondary catalyst to reduce N2O and the first project campaign started on 28/07/2007.

The 11th monitoring period began on 27/07/2015 – 17:00 and ended on 27/07/2016 – 16:00.

During this monitoring period the project activity has been in normal operation and no special event occurred which may have impacted the applicability of the methodology.

Find below the relevant events for the period:

| Event | Period | |
|---|---|---|
| | Beginning | End |
| Beginning of monitoring period #11 | 27/07/2015 - 17:00 | |
| Nitric acid shutdown due to reduction of pressure of steam 40 kgf/cm$^2$ | 11/08/2015 - 18:58 | 12/08/2015 - 14:33 |
| Nitric Acid Unit shutdown caused by safety trip | 28/08/2015 - 20:25 | 29/08/2015 - 14:35 |
| Nitric Acid Unit shutdown due to planned maintenance | 13/09/2015 - 16:50 | 01/10/2015 - 06:39 |
| Nitric Acid Unit shutdown caused by safety trip | 01/10/2015 - 07:10 | 01/10/2015 - 12:56 |
| Nitric Acid Unit shutdown caused by safety trip | 02/10/2015 - 19:07 | 03/10/2015 - 06:29 |
| Nitric Acid Unit shutdown caused by safety trip | 06/10/2015 - 14:12 | 06/10/2015 - 19:52 |
| Nitric Acid Unit shutdown caused by safety trip | 21/10/2015 - 11:47 | 21/10/2015 - 16:42 |
| Nitric acid shutdown caused by low level of Ammonia stock. Unit remained stopped due to shutdown of Adipic Acid Unit | 07/11/2015 - 17:10 | 08/01/2016 - 15:37 |
| Nitric acid shutdown caused by water leakage in outlet of stage 2 of column | 01/02/2016 - 09:28 | 03/02/2016 - 15:03 |
| Nitric acid shutdown caused by leakage in stages A-22 and A-5 of columns | 16/02/2016 - 03:03 | 16/02/2016 - 16:35 |
| Nitric Acid Unit shutdown caused by safety trip | 05/03/2016 - 15:14 | 06/03/2016 - 06:45 |
| Nitric acid plant shutdown caused by raw water leakage | 11/03/2016 - 00:13 | 11/03/2016 - 15:05 |
| Nitric acid plant shutdown caused by high level at Atibaia river. Catalyst gauzes replacement | 11/03/2016 - 17:35 | 19/03/2016 - 15:35 |
| Nitric Acid Unit shutdown caused by safety trip | 19/03/2016 - 19:16 | 19/03/2016 - 22:34 |
| Nitric Acid Unit shutdown caused by safety trip | 03/04/2016 - 06:46 | 04/04/2016 - 14:24 |
| Nitric Acid Unit shutdown caused by safety trip | 10/04/2016 - 09:49 | 10/04/2016 - 14:39 |
| Nitric acid plant shutdown caused by high level at F-1769 | 16/04/2016 - 20:14 | 27/04/2016 - 15:21 |
| Nitric acid plant shutdown caused by no-break failure | 30/04/2016 - 15:36 | 30/04/2016 - 20:43 |
| Nitric Acid Unit shutdown caused by safety trip | 12/06/2016 - 11:32 | 13/06/2016 - 14:26 |
| Nitric Acid Unit shutdown caused by safety trip | 16/06/2016 - 17:03 | 13/07/2016 - 13:22 |
| Nitric acid plant shutdown caused by high vibration at compressor Rateau | 14/07/2016 - 18:31 | 30/07/2016 - 17:38 |
| End of monitoring period #11 | | 27/07/2016 - 16:59 |

## B.2. Post-registration changes

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

No request for temporary deviation from registered monitoring plan or applied methodology was applied to this monitoring period.

### B.2.2. Corrections

No correction related to project information or parameters fixed at validation was approved during this monitoring period or submitted with this monitoring report.

### B.2.3. Changes to start date of crediting period

No changes to the start date of crediting period was approved during this monitoring period or submitted with this monitoring report.

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

No inclusion of a monitoring plan to the registered PDD that was not included at registration was approved during this monitoring period or submitted with this monitoring report.

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

No permanent changes from registered monitoring plan or applied methodology or applied standardized baseline was approved during this monitoring period or submitted with this monitoring report.

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

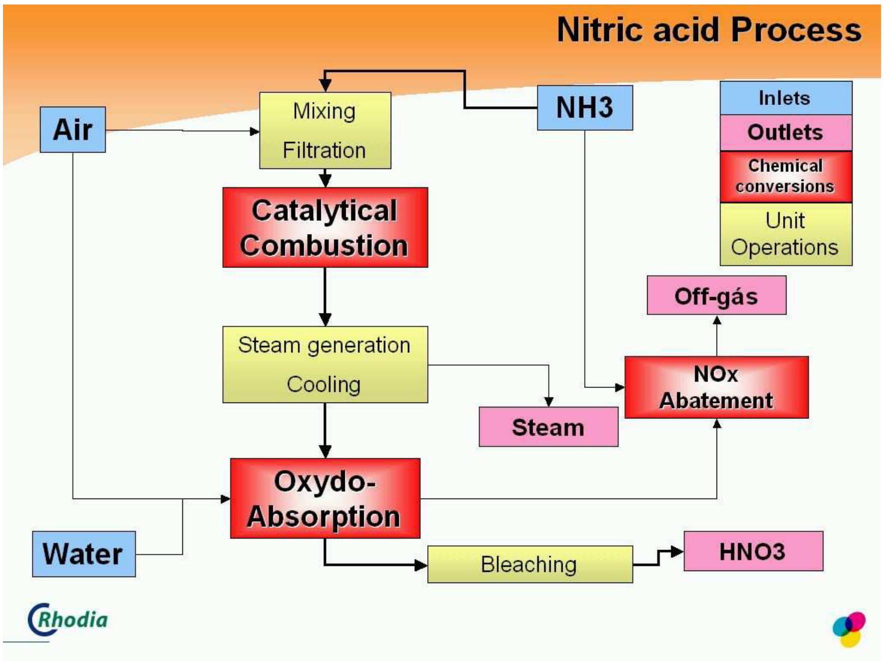
No changes to the project design of registered project activity was approved during this monitoring period or submitted with this monitoring report.

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

Not applicable

## SECTION C. Description of monitoring system

The project boundary encompasses the complete process equipment for the nitric acid production as it can be seen in the simplified scheme of the nitric acid plant presented below.




The only GHG emission important to the project activity is N2O contained in the waste stream exiting the stack.

An overview of all emission sources inside the project boundary can be verified below:

| | Source | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| **Baseline** | Nitric Acid Plant (Burner Inlet to Stack) | $CO_2$ | No | The process does not lead to any $CO_2$ and $CH_4$ emissions |
| | | $CH_4$ | No | |
| | | $N_2O$ | Yes | |
| **Project Activity** | Nitric Acid Plant (Burner Inlet to Stack) | $CO_2$ | No | The process does not lead to any $CO_2$ and $CH_4$ emissions |
| | | $CH_4$ | No | |
| | | $N_2O$ | Yes | |
| | Leakage emissions from production, transport, operation and decommissioning of the catalyst | $CO_2$ | No | No leakage emissions are expected |
| | | $CH_4$ | No | |
| | | $N_2O$ | No | |

All data collection procedures, the organizational structure, the rules and responsibilities and procedures for dealing with abnormal situations are described in detail in the Data Handling Protocol and Data Review Protocol which are documents of Rhodia Quality System and are available to audit.
Taking into account the good monitoring practice and performance characteristics, the nitric acid plant on Rhodia site at Paulínia is ISO9001 and ISO14000 certified.

The overall responsibility, including the publication of the monitoring report, is with Rhodia Energy GHG represented by the $CO_2$ operations director.

The monitoring process is under the responsibility of the Nitric Acid Plant Manager. The description of these activities is made in the Data Handling Protocol.

The operation, data transfer and reporting procedures are incorporated into the ISO9001:2008 procedures of the Nitric Acid plant.

The monitoring procedures for baseline and project campaigns are described below.

The data collection is done by the production supervisor and/or plant operations technician who are responsible by data collection during plant operation.

The data are processed, validated, adjusted if necessary, and recorded. The nitric acid plant Process Engineer or the Production Engineer or the Production Coordinator is in charge of programming all formulae in the spreadsheets. The plant operations technician processes the data, checks the data for consistency, validates them, and records them every day as an electronic file. In case of failure of an instrument, or inconsistency of the data, he/she adjusts the data according to the Data Handling Protocol. In case the failure is not covered by the procedure, the nitric acid plant Manager makes the decision to correct the figures or to abandon the data.

The data archiving is done by nitric acid plant Production Engineer or Process Engineer or Production Coordinator. Once validated, the data are input into an electronic file (Workbook) and protected against any modification. The data are stored on the PIMS server, which is submitted to the back-up policy in the Rhodia's corporate network. Both original documents and the backup file are kept for the project crediting period. The Workbook is saved both electronically and on paper.

The calculation of emission reductions is done after each campaign by the nitric acid plant Production Engineer or Process Engineer or Production Coordinator, based on the campaign data, and validated by the nitric acid Plant Manager. This last one is responsible also for validating the Emission Reductions calculation.

As the Paulínia nitric acid plant is certified in ISO 9001:2008, the competence, awareness and training stated in the ISO 9001:2008 is met. There is a training procedure for the nitric acid plant (UQP-3-INT-TR-002) and the changes introduced due to this project were done according to that procedure for the operation team. For the lab team, which is responsible for the adjustments, calibration and operation of the $N_2O$ analyzer, the corresponding training was done according to the procedure UQP-2-DCA-RH-013.

All measured variables to be collected for the baseline and the project activity campaigns are considered critical process variables. The critical variables instruments calibration plan follows the critical variables procedures, and is included in the scope of the yearly ISO9001 audit.
The European Norm EN 14181:2004 is recommended as guidance regarding the selection, installation and operation of the Automatic Measuring System (AMS) for the GHG concentration in the off-gas under Monitoring Methodology AM0034 version 2, and stipulates three levels of Quality Assurance Levels (QAL) and an Annual Surveillance Test (AST):

- QAL1: Suitability of the AMS for the specific measuring task.

The EN 14181: 2004 QAL1 report was provided by the equipment manufacturer considering the performance characteristics as measured by a qualified Technical Inspection Authority. The QAL1 report confirmed that the $N_2O$ analyzer (an AO 2000- URAS 14 NDIR supplied by ABB GmbH) is suitable to perform the indicated analysis ($N_2O$ concentration). The equipment manufacturer report was handed to the DOE for verification.

- QAL2: Validation of the AMS following the installation.

QAL2 describes a procedure for the determination of the calibration function and its variability, by means of certain number of parallel measurements, performed with a Standard Reference Method (SRM). The testing performing the measurements with the SRM shall have an accredited quality assurance system according to EN ISO/IEC 17025 or relevant (national) standards.
The last QAL2 test was performed for $N_2O$ Analyzer on March 2015, during monitoring period #10, by SGS Environmental Services. The QAL2 report was made available for verification of DOE.

- QAL3: Ongoing quality assurance during operation.

According to EN 14181: 2004 drift and precision are checked in order to demonstrate that the AMS is in control during its operations so that it continues to function within the required specification for uncertainty.

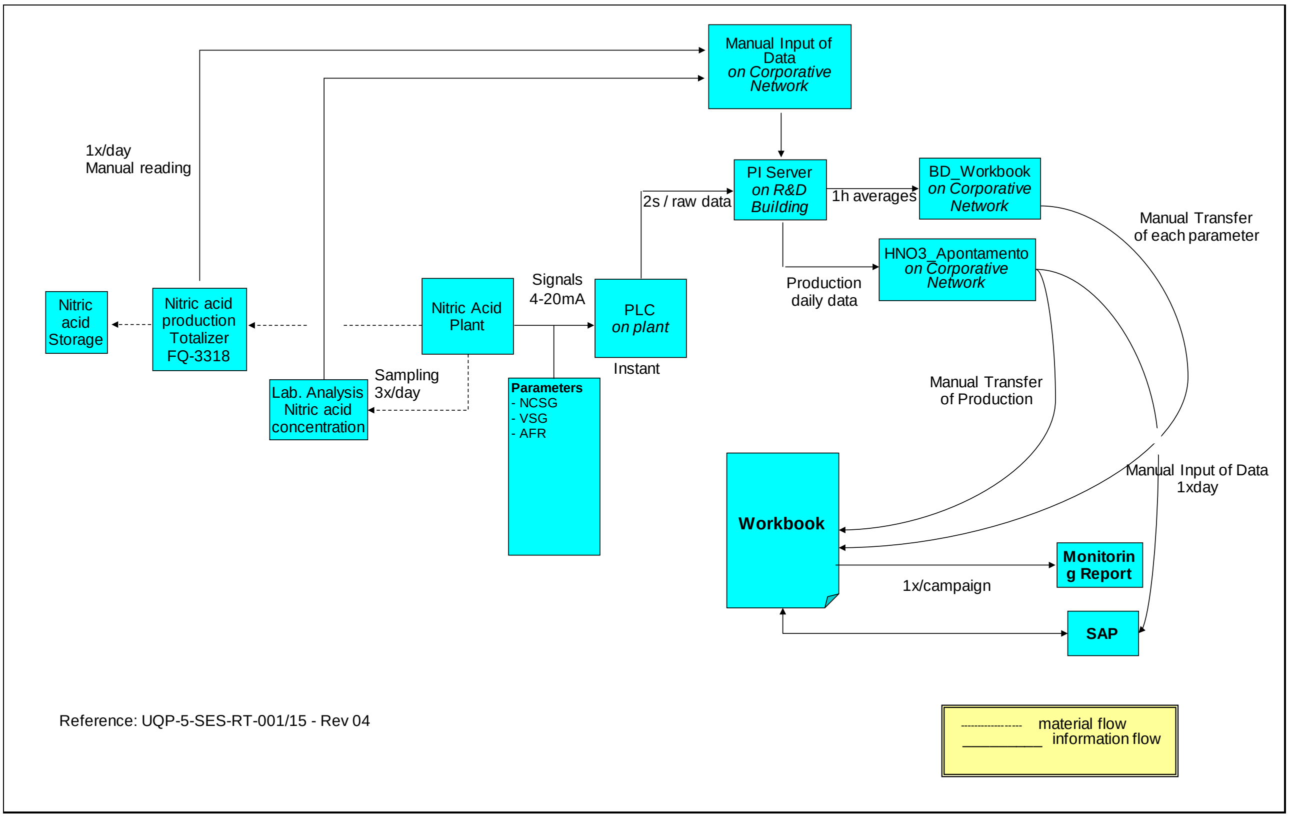
This is achieved by conducting periodic zero and span checks on the AMS, and evaluating results obtained using CUSUM (Cumulative Sum) control charts as recommended in Annex C of EN 14181:2004.

- AST: Annual validation of AMS

Taking into account EN 14181:2004 this test is to be done in order to evaluate that: (i) it functions correctly and its performance remains valid and (ii) its calibration function and variability remain as previously determined.

The Annual Surveillance Test (AST) has been performed in July 2012, July 2013, March 2015 and March/April 2016 by SGS Environmental Services. The documents from each work are made available for verification of DOE.

Considering the data management the following diagram illustrates the entire process of data acquisition, storage and transfer to the Workbook and preparation of the monitoring report:



# SECTION D. Data and parameters

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

| **Data / Parameter** | **Operating pressure** |
|---|---|
| **Data unit** | kPa |
| **Description** | Operating pressure of the ammonia burner |
| **Source of data** | Manufacturer specifications |
| **Value(s) applied** | Between 359 and 385 kPa |
| **Purpose of data** | The parameter is used to determine whether the nitric acid plant operates at a low, medium or high pressure |
| **Additional comment** | - |

| **Data / Parameter** | $EF_{historical}$ |
|---|---|
| **Unit** | kg $N_2O$/t $HNO_3$ |
| **Description** | Historical baseline emission factor of the nitric acid plant |
| **Source of data** | Historical information from issuance reports of CDM-PDD documents |
| **Value(s) applied** | 5.7603 |
| **Purpose of data** | Baseline emissions |
| **Additional comment** | This value will remain constant over the second and third crediting period |

| **Data / Parameter** | $EF_{default}$ |
|---|---|
| **Unit** | kg $N_2O$/t $HNO_3$ |
| **Description** | Default emission factor according to the operating pressure of the ammonia burner in year *y* (related to 100 per cent pure acid) |
| **Source of data** | This default $N_2O$ baseline emission factor will vary every year. In the year 2013 the emission factors will be 5.5; 8.4; and 12.6 kg $N_2O$/t $HNO_3$ for low, medium and high pressure ammonia burners. For each subsequent year, the emission factors will decrease by 0.2 kg $N_2O$/t $HNO_3$ until they reach a value of 2.5 or 2.4. After reaching the values of 2.5 or 2.4 the emission factor will remain constant over time: |

| **Year** | **Low pressure (0 – 200 kPa)** | **Medium pressure (200 – 600kPa)** | **High pressure (Over 600 kPa)** |
|---|---|---|---|
| 2013 | 5.5 | 8.4 | 12.6 |
| 2014 | 5.3 | 8.2 | 12.4 |
| 2015 | 5.1 | 8 | 12.2 |
| 2016 | 4.9 | 7.8 | 12 |
| 2017 | 4.7 | 7.6 | 11.8 |
| 2018 | 4.5 | 7.4 | 11.6 |
| 2019 | 4.3 | 7.2 | 11.4 |
| 2020 | 4.1 | 7 | 11.2 |
| 2021 | 3.9 | 6.8 | 11 |
| 2022 | 3.7 | 6.6 | 10.8 |
| 2023 | 3.5 | 6.4 | 10.6 |

| | | | | | |
|---|---|---|---|---|---|
| | 2024 | 3.3 | 6.2 | 10.4 | |
| | 2025 | 3.1 | 6 | 10.2 | |
| | 2026 | 2.9 | 5.8 | 10 | |
| | 2027 | 2.7 | 5.6 | 9.8 | |
| | 2028 | 2.5 | 5.4 | 9.6 | |
| | 2029 | 2.5 | 5.2 | 9.4 | |
| | 2030 | 2.5 | 5 | 9.2 | |
| **Value(s) applied** | 7.8 | | | | |
| **Purpose of data** | Baseline emissions | | | | |
| **Additional comment** | The decrease in the value for the baseline emission factor over time is to reflect the technological development | | | | |

| | |
|---|---|
| **Data / Parameter** | $EF_{new}$ |
| **Unit** | kg $N_2O$/t $HNO_3$ |
| **Description** | Baseline $N_2O$ emission factor for nitric acid production in year *y* (related to 100 per cent pure acid) |
| **Source of data** | The baseline $N_2O$ emission factor for nitric acid production will vary every year. In year 2005 the emission factor will be 5.1 and then it will decrease every year until it reaches a final value of 2.5 in the year 2020. The value of 2.5 will remain constant after 2020, as provided in the following table: |

| Year | Emission factor (kg$N_2O$/t $HNO_3$) |
|---|---|
| 2005 | 5.1 |
| 2006 | 4.9 |
| 2007 | 4.7 |
| 2008 | 4.6 |
| 2009 | 4.4 |
| 2010 | 4.2 |
| 2011 | 4.1 |
| 2012 | 3.9 |
| 2013 | 3.7 |
| 2014 | 3.5 |
| 2015 | 3.4 |
| 2016 | 3.2 |
| 2017 | 3 |
| 2018 | 2.8 |
| 2019 | 2.7 |
| 2020 | 2.5 |
| 2021 | 2.5 |
| 2022 | 2.5 |
| 2023 | 2.5 |
| … | … |
| Year n | 2.5 |

| | |
|---|---|
| **Value(s) applied** | 3.2 |
| **Purpose of data** | Baseline emissions |
| **Additional comment** | The decrease in the value for the baseline emission factor over time is to reflect the technological development |

| | |
|---|---|
| **Data / Parameter** | **$P_{product,max}$** |
| **Unit** | t $HNO_3$ |
| **Description** | Design capacity of nitric acid production during the first crediting period |
| **Source of data** | Project operator and/or technology provider |
| **Value(s) applied** | 55,900 |
| **Purpose of data** | Baseline emissions |
| **Additional comment** | This parameter is only for project activities that have used AM0034 or AM0028 in the first crediting period |

| | |
|---|---|
| **Data / Parameter** | **$GWP_{N2O}$** |
| **Unit** | $tCO_2e/tN_2O$ |
| **Description** | Global warming potential of the $N_2O$ during the crediting period |
| **Source of data** | IPCC http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14 |
| | "Standard for application of the global warming potentials to CDM project activities and PoAs for the second commitment period of the Kyoto Protocol (version 01.0)" |
| **Value(s) applied** | 298 |
| **Purpose of data** | Baseline emissions and project emissions |
| **Additional comment** | **-** |

## D.2. Data and parameters monitored

<table>
<tr><td>Data / Parameter</td><td colspan="5">$P_{production,y}$</td></tr>
<tr><td>Unit</td><td colspan="5">t $HNO_3$</td></tr>
<tr><td>Description</td><td colspan="5">Nitric acid produced in the period</td></tr>
<tr><td>Measured /Calculated /Default:</td><td colspan="5">Measured</td></tr>
<tr><td>Source of data</td><td colspan="5">Flow meter (totalizer). Plant accounting</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td colspan="5">33,683</td></tr>
<tr><td rowspan="16">Monitoring equipment</td><td colspan="5">Flow meter (totalizer). Plant accounting</td></tr>
<tr><td>Equipment</td><td>Type</td><td>Accuracy Class</td><td>Calibration frequency</td><td>Calibration information</td></tr>
<tr><td rowspan="4">Nitric acid mass flow meter<br>(FQ-2179)<br>Serial number<br>14332035<br>3236140</td><td rowspan="4">Mass flow meter</td><td rowspan="4">+/- 0.1 %</td><td rowspan="4">2 years</td><td>Last Calibration</td></tr>
<tr><td>18/04/2016</td></tr>
<tr><td>Valid until</td></tr>
<tr><td>17/04/2018</td></tr>
<tr><td rowspan="4">Fresh nitric acid conc. analyzer<br>(AI-2179)<br>Serial number<br>14332035<br>3236140</td><td rowspan="4">Device integrated to mass flow meter FQ-2179</td><td rowspan="4">+/- 0.5 %</td><td rowspan="4">2 years</td><td>Last Calibration</td></tr>
<tr><td>18/04/2016</td></tr>
<tr><td>Valid until</td></tr>
<tr><td>17/04/2018</td></tr>
<tr><td rowspan="4">Level of nitric acid storage tank<br>F-1769<br>(LI-3350)<br>Smar<br>U123502</td><td rowspan="4">Air bubble gauge (back-up for FQ-2179)</td><td rowspan="4">+/- 0.07 %</td><td rowspan="4">Yearly</td><td>Last Calibration</td></tr>
<tr><td>18/12/2015</td></tr>
<tr><td>Valid until</td></tr>
<tr><td>16/12/2016</td></tr>
<tr><td rowspan="2">Flow meter of fresh nitric acid to storage<br>(FQ-3318)<br>Emerson</td><td rowspan="2">Magnetic Flow Meter (back-up from FQ-2179)</td><td rowspan="2">+/- 0.5 %</td><td rowspan="2">Yearly</td><td>Last Calibration</td></tr>
<tr><td>29/06/2016</td></tr>
</table>

| | | | | | |
|---|---|---|---|---|---|
| | 07FM-C203 (Flow meter) 07TM-C203 up to 28/11/2015 0304645 since 22/12/2015 (Transmitter) | | | | Valid until 28/06/2017 |
| | Truck weigh scale (BB-0090) Serial Number 7597 | Load cell 80,000 kg | +/- 15 kg | 2/year | Last Calibration 15/05/2016 Valid until 13/11/2016 |
| | Truck weigh scale (BB-0335) Serial Number 28812 | Load cell | +/- 15 kg | 2/year | Last Calibration 08/05/2016 Valid until 06/11/2016 |
| | Titrando 836 (BR006-TP-TI3-01) Serial Number 1836001011152 | Potenciomet. Titrator to analyze the nitric acid concentration | +/- 0.2 mV | 2/year | Last Calibration 05/05/2016 Valid until 03/11/2016 |
| | Lab equipment DL-55 Serial Number 1905001029306 | Potenciometr. Titrator to analyse the nitric acid concentration (backup from Titrando 836) | +/- 0.2 mV | 2/year | Last Calibration 13/06/2016 Valid until 12/012/2016 |
| **Measuring/ Reading/ Recording frequency:** | Measured continuously/Recorded daily | | | | |
| **Calculation method (if applicable):** | Not applicable | | | | |
| **QA/QC procedures** | Paulínia nitric acid plant is ISO 9001 certified. This measurement is considered as a critical measurement on the ISO 9001, so calibration routines and periodic check-up is follow-up by the quality system | | | | |
| **Purpose of data** | Baseline emissions | | | | |
| **Additional comment** | Records to be maintained during project's lifetime | | | | |

<table>
<tr><td>Data / Parameter</td><td colspan="5">$h_y$</td></tr>
<tr><td>Unit</td><td colspan="5">h</td></tr>
<tr><td>Description</td><td colspan="5">Number of hours of operation in the period</td></tr>
<tr><td>Measured /Calculated /Default:</td><td colspan="5">Measured / Calculated</td></tr>
<tr><td>Source of data</td><td colspan="5">Production log</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td colspan="5">5,237.5</td></tr>
<tr><td rowspan="14">Monitoring equipment</td><td colspan="5">Flow meter (totalizer). Plant accounting</td></tr>
<tr><td>Equipment</td><td>Type</td><td>Accuracy Class</td><td>Calibration frequency</td><td>Calibration information</td></tr>
<tr><td rowspan="12">NH3 flow meter (Venturi) to oxidation reactor</td><td rowspan="4">FT-3122 NH3 flow transmitter Yokogawa s/n: B1P700499</td><td rowspan="12"></td><td rowspan="4">Yearly</td><td>Last Calibration</td></tr>
<tr><td>21/06/2016</td></tr>
<tr><td>Valid until</td></tr>
<tr><td>20/06/2017</td></tr>
<tr><td rowspan="4">PT-3122 NH3 pressure transmitter Smar s/n: U578202</td><td rowspan="4">Yearly</td><td>Last Calibration</td></tr>
<tr><td>21/06/2016</td></tr>
<tr><td>Valid until</td></tr>
<tr><td>20/06/2017</td></tr>
<tr><td rowspan="4">TT-3122 NH3 temperature transmitter 49256-05</td><td rowspan="4">Yearly</td><td>Last Calibration</td></tr>
<tr><td>21/06/2016</td></tr>
<tr><td>Valid until</td></tr>
<tr><td>20/06/2017</td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td colspan="5">Measured continuously/Recorded daily</td></tr>
<tr><td>Calculation method (if applicable):</td><td colspan="5">The number of hours of operation is daily calculated subtracting the hours when the ammonia feed on the reactor is below of 0.8 t/h. This calculation is done by PIMS considering the value of ammonia feed provided by flowmeter.</td></tr>
<tr><td>QA/QC procedures</td><td colspan="5">Paulínia nitric acid plant is ISO 9001 certified. This measurement is considered as a critical measurement on the ISO 9001, so calibration routines and periodic check-up is follow-up by the quality system</td></tr>
<tr><td>Purpose of data</td><td colspan="5">Baseline emissions</td></tr>
<tr><td>Additional comment</td><td colspan="5">Records to be maintained during project’s lifetime</td></tr>
</table>

| | |
|---|---|
| **Data / Parameter** | **$h_{r,y}$** |
| **Unit** | h |
| **Description** | Number of hours in year y where, for secondary N2O abatement, abatement system was not installed, underperforming or failed |
| **Measured /Calculated /Default:** | Measured/Calculated |
| **Source of data** | Production log |
| **Value(s) of monitored parameter:** | 7 |
| **Monitoring equipment** | |
| **Measuring/ Reading/ Recording frequency:** | Calculated hourly |
| **Calculation method (if applicable):** | $h_{r,y}$ is determined by comparison of $F_{N2O,tail\ gas,h}$ and $EF_{existing,y}$ x $P_{NA,h}$<br>This comparison is done on an hourly basis. |
| **QA/QC procedures** | Paulínia nitric acid plant is ISO 9001 certified. This measurement is considered as a critical measurement on the ISO 9001, so calibration routines and periodic check-up is follow-up by the quality system |
| **Purpose of data** | Baseline emissions |
| **Additional comment** | Records to be maintained during project's lifetime |

<table>
<tr><td>Data / Parameter</td><td colspan="5">NCSG</td></tr>
<tr><td>Unit</td><td colspan="5">$mg/Nm^3$</td></tr>
<tr><td>Description</td><td colspan="5">$N_2O$ concentration in the stack gas</td></tr>
<tr><td>Measured /Calculated /Default:</td><td colspan="5">Measured</td></tr>
<tr><td>Source of data</td><td colspan="5">The data are automatically acquired continuously by DCS and stored in the PIMS.</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td colspan="5">For this second credit period, methodology defines usage of hourly average value for calculation during the monitoring period. Due to the volume of data, these values are provided to DOE auditors at Workbook for evaluation</td></tr>
<tr><td rowspan="5">Monitoring equipment</td><td colspan="5">ABB Infrared analyzer series 2000/URAS 14 – model AO2040. The Measurement Principle is a non-dispersive infrared absorption in the λ = 2.5–8 µm wavelength range. Because of analyzer technology, water has to be removed. So, this is a dry-basis measurement. For the project campaigns, Rhodia keeps the dry basis data as a conservative approach (the value for water content in the waste gas is considered to be zero)</td></tr>
<tr><td>Equipment</td><td>Type</td><td>Accuracy Class</td><td>Calibration frequency</td><td>Calibration information</td></tr>
<tr><td rowspan="3">$N_2O$ concentration analyzer in the stack</td><td rowspan="3">$N_2O$ concentration analyzer</td><td rowspan="3">+/- 0.5 %</td><td rowspan="3">Each 2 weeks (Rhodia calibration)</td><td>Last Calibration</td></tr>
<tr><td>27/07/2016</td></tr>
<tr><td>Valid until</td></tr>
</table>

| | | | | | |
|---|---|---|---|---|---|
| | (AIC-3500C)<br>Serial Number<br>3345914.6 | | | | Following<br>15 days |
| | | | | 2x/year (third party calibration) | Last Calibration |
| | | | | | 23/052016 |
| | | | | | Valid until |
| | | | | | 21/11/2016 |
| **Measuring/ Reading/ Recording frequency:** | Measured continuously/Recorded daily | | | | |
| **Calculation method (if applicable):** | Not applicable | | | | |
| **QA/QC procedures** | Paulínia nitric acid plant is ISO 9001 certified. This measurement is considered as a critical measurement on the ISO 9001, so calibration routines and periodic check-up is follow-up by the quality system | | | | |
| **Purpose of data** | Baseline and project emissions | | | | |
| **Additional comment** | Records to be maintained during project's lifetime | | | | |

| **Data / Parameter** | **VSG** | | | | |
|---|---|---|---|---|---|
| **Unit** | $Nm^3/h$ | | | | |
| **Description** | Volume flow rate of stack gas | | | | |
| **Measured /Calculated /Default:** | Measured | | | | |
| **Source of data** | The data are automatically acquired continuously by DCS and stored in the PIMS. | | | | |
| **Value(s) of monitored parameter:** | For this second credit period, methodology defines usage of hourly average value for calculation during the monitoring period. Due to the volume of data, these values are provided to DOE auditors at Workbook for evaluation | | | | |
| **Monitoring equipment** | Venturi flow meter built according standard ISO 5167 - 2003 Edition. The same multi-variable transmitter provides also the temperature and pressure at the stack where the gas flow is measured. Those are considered as critical variables, so they are included in the ISO-9001 Nitric Acid Plant procedures. | | | | |
| | **Equipment** | **Type** | **Accuracy Class** | **Calibration frequency** | **Calibration information** |
| | Gas flow<br>(FI-3212)<br>Serial Number<br>91F404443-612 | Venturi – Multi variable transmitter | +/- 2.0 % | Yearly | Last Calibration |
| | | | | | 22/062016 |
| | | | | | Valid until |
| | | | | | 21/06/2017 |
| | Gas pressure<br>(PI-3212) | | | Yearly | Last Calibration |
| | | | | | 22/06/2016 |

| | | | | | |
|---|---|---|---|---|---|
| | Serial Number<br>91F404443-612 | | | | Valid until<br>21/06/2017 |
| | Gas temperature<br>(TE-3212)<br>Serial Number<br>91F404443-612 | | | Yearly | Last Calibration<br>22/06/2016<br>Valid until<br>21/06/2017 |

| | |
|---|---|
| **Measuring/ Reading/ Recording frequency:** | Measured continuously/Recorded daily |
| **Calculation method (if applicable):** | Not applicable |
| **QA/QC procedures** | Paulínia nitric acid plant is ISO 9001 certified. This measurement is considered as a critical measurement on the ISO 9001, so calibration routines and periodic check-up is follow-up by the quality system |
| **Purpose of data** | Baseline and project emissions |
| **Additional comment** | Records to be maintained during project’s lifetime |

## Calibrations during current Monitoring Period

## Monitoring Period #11

| Tag number | Description | | Parameter in PDD | Reference | Period | Done by | Previous calibration dates | Last calibration date |
|---|---|---|---|---|---|---|---|---|
| FI-3212 | Stack gas flow meter (Venturi) | FI-3212 Stack gas flow transmitter | VSG | Manufacturer Specifications | Yearly | Rhodia | 16/12/2014<br>15/09/2015 | 22/06/2016 |
| | | PI-3212 Stack gas pressure transmitter | PSG | Manufacturer Specifications | Yearly | Rhodia | | |
| | | TE-3212 Stack gas temperature transmitter | TSG | Manufacturer Specifications | Yearly | Rhodia | | |
| AIC-3500C | N2O concentration analyzer in the stack | | NCSG | Manufacturer Specifications | each 2 weeks | Rhodia | 20/07/2015<br>03/08/2015<br>17/08/2015<br>26/08/2015<br>09/09/2015<br>23/09/2015<br>07/10/2015<br>21/10/2015<br>04/11/2015<br>18/11/2015<br>02/12/2015<br>16/12/2015<br>30/12/2015<br>13/01/2016<br>27/01/2016<br>10/02/2016<br>24/02/2016<br>07/03/2016<br>09/03/2016<br>23/03/2016<br>06/04/2016<br>20/04/2016<br>04/05/2016<br>18/05/2016<br>01/06/2016<br>15/06/2016<br>29/06/2016<br>13/07/2016 | 27/07/2016 |
| | | | | Manufacturer Specifications | 2/year | Third party | 16/07/2015;<br>15/12/2015 | 23/05/2016 |
| FQCS-3122 | NH3 flow meter (Venturi) to oxidation reactor (AFR) | FT-3122 NH3 flow transmitter | AFR | Manufacturer Specifications | Yearly | Rhodia | 21/04/2015<br>14-09-2015 | 21/06/2016 |
| | | PT-3122 NH3 pressure transmitter | | Manufacturer Specifications | Yearly | Rhodia | 21/04/2015<br>14-09-2015 | 21/06/2016 |
| | | TT-3122 NH3 temperature transmitter | | Manufacturer Specifications | Yearly | Rhodia | 16/12/2014<br>15-09-2015 | 21/06/2016 |
| FRAS-3123 | Primary air flow to oxidation reactor | FT-3123 Primary air flow transmitter | Used for AIFR calculation | Manufacturer Specifications | Yearly | Rhodia | 14/09/2015 | 21/06/2016 |
| | | PT-3123 Primary air pressure transmitter | | Manufacturer Specifications | Yearly | Rhodia | 14/09/2015 | 21/06/2016 |
| | | TT-3123 Primary air temperature transmitter | | Manufacturer Specifications | Yearly | Rhodia | 15/09/2015 | 21/06/2016 |
| PI-3115 | Oxidation reactor pressure | | OPnormal and OPh | Manufacturer Specifications | Yearly | Rhodia | 16/12/2014<br>14/09/2015 | 22/06/2016 |
| TRA-3136 | Oxidation reactor temperature | | OTnormal and OTh | Manufacturer Specifications | Yearly | Rhodia | 26/06/2015 | 17/03/2016 |
| Lab Equipment (DL-55/eq. 3) / Titrando 905 | Potenciometric Titrator to analyze the nitric acid concentration (backup of Titrando 836) | | HNO3_production | Manufacturer Specifications | 2/year | Third party | 04/02/2015<br>29/07/2015<br>21/12/2015 | 25/01/2016<br>13/06/2016 |
| Titrando 836 (BR006-TP-TI3-01) | Potenciometric Titrator to analyze the nitric acid concentration | | HNO3_production | Manufacturer Specifications | 2/year | Third party | 22/05/2015<br>09/11/2015 | 05/05/2016 |
| FQ-3318 | Nitric acid totalizer to storage tank F-1769 | | HNO3_production | Manufacturer Specifications | Yearly | Third party | 30/03/2015<br>16/09/2015 | 29/06/2016 |
| FQ-2179 | Nitric acid mass flowmeter | | HNO3_production | Manufacturer Specifications | 2 years | Third party | 07/05/2014 | 18/04/2016 |
| AI-2179 | Fresh nitric acid conc analyzer | | HNO3_production | Manufacturer Specifications | 2 years | Third party | 07/05/2014 | 18/04/2016 |
| LI-3350 | Level of nitric acid storage tank F-1769 | | HNO3_production | Manufacturer Specifications | Yearly | Rhodia | 11/02/2014<br>20/01/2015 | 18/12/2015 |
| BB-0090 | Truck Balance to control purchased Nitric Acid | | HNO3_production | INMETRO - Brazil Standard Portaria no. 236 (22December1994) | 2/year | Third party | 04/01/2015<br>24/05/2015<br>17/11/2015 | 15/05/2016 |

| Tag number | Description | Parameter in PDD | Reference | Period | Done by | Previous calibration dates | Last calibration date |
|---|---|---|---|---|---|---|---|
| BB-0335 | Truck Balance to control purchased Nitric Acid | HNO3_production | INMETRO - Brazil Standard Portaria no. 236 (22December1994) | 2/year | Third party | 17/05/2015<br>27/10/2015 | 08/05/2016 |
| AICY-3500 | NOx concentration analyzer in the stack | NOx emission control | Manufacturer Specifications | each 28 days | Rhodia | 13/07/2015<br>10/08/2015<br>21/08/2015<br>02/09/2015<br>30/09/2015<br>28/10/2015<br>25/11/2015<br>23/12/2015<br>20/01/2016<br>17/02/2016<br>16/03/2016<br>13/04/2016<br>11/05/2016<br>09/06/2016 | 06/07/2016 |
| | | | Manufacturer Specifications | 2/year | Third party | 13/07/2015<br>22/12/2015 | 07/06/2016 |
| AIRS-3001 | NOx concentration analyzer in the stack (back-up of AICY-3500) | NOx emission control | Manufacturer Specifications | each 28 days | Rhodia | 13/07/2015<br>10/08/2015<br>02/09/2015<br>30/09/2015<br>28/10/2015<br>25/11/2015<br>23/12/2015<br>20/01/2016<br>17/02/2016<br>16/03/2016<br>13/04/2016<br>11/05/2016<br>08/06/2016<br>06/07/2016 | 17/07/2014 |
| | | | Manufacturer Specifications | 2/year | Third party | 24/04/2015<br>14/10/2015 | 11/04/2016 |

* Source of data: Quality Management System and SAP
**INMETRO - Instituto Nacional de Metrologia** www.inmetro.gov.br
**ONS - Operador Nacional do Sistema Elétrico** www.ons.org.br

## D.3. Implementation of sampling plan

Not applicable: ACM0019, V 02.0 does not specify any requirement on sampling

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

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

The $N_2O$ emission factor for nitric acid plant in the first crediting period in year y ($EF_{existing,y}$) is :

$$EF_{existing,y} = min\{EF_{historical}; EF_{default,y}\}$$

| | | | |
|---|---|---|---|
| $EF_{default,y}$ | = | 7.8 | kg $N_2O$/t $HNO_3$ |
| $EF_{historical,y}$ | = | 5.7603 | kg $N_2O$/t $HNO_3$ |
| | | | |
| $EF_{existing,y}$ | = | 5.7603 | kg $N_2O$/t $HNO_3$ |

The baseline emissions are:

$$BE_y = \begin{pmatrix} min\{P_{production,y}; P_{product,max}\} \times EF_{existing,y} + \\ max\{P_{production,y} - P_{product,max}; 0\} \times EF_{new,y} \end{pmatrix} \times \frac{(h_y - h_{r,y})}{h_y} \times GWP_{N2O} \times 10^{-3}$$

| | | | |
|---|---|---|---|
| $\mathbf{P_{product,max}}$ | = | 55,900 | t $HNO_3$ |
| $\mathbf{P_{production,y}}$ | = | 33,682.6 | t $HNO_3$ |
| $\mathbf{EF_{existing,y}}$ | = | 5.7603 | kg $N_2O$/t $HNO_3$ |
| $\mathbf{EF_{new,y}}$ | = | 3.2 | kg $N_2O$/t $HNO_3$ |
| $\mathbf{GWP_{N2O}}$ | = | 298 | $tCO_2e/tN_2O$ |
| $\mathbf{h_y}$ | = | 5,237.5 | h |
| $\mathbf{h_{r,y}}$ | = | 7 | h |
| | | | |
| $\mathbf{BE_y}$ | **=** | **57,741** | **t $CO_2$e** |

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

$PE_y$ = $PE_{N2O,y}$

$$PE_{N2O,y} = \sum_{1}^{h_y - h_{r,y}} F_{N2O,tail\,gas,h} \times GWP_{N20} \times 10^{-3}$$

| | | | |
|---|---|---|---|
| $\Sigma F_{N2O,tailgas,h}$ | = | 25,208.1 | kg $N_2O$ |
| $GWP_{N2O}$ | = | 298 | $tCO_2e/tN_2O$ |
| | | | |
| $\mathbf{PE_y}$ | **=** | **7,512** | **t $CO_2$e** |

### E.3. Calculation of leakage

As defined in ACM0019, V 02.0, any leakage emissions sources are deemed to be negligible.

### 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** | **57,741** | **7,512** | **0** | **0** | **50,229** | **50,229** |

### 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)** | **71,364** | **50,229** |

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

For this monitoring period, it was observed a lower emission reductions (50,229 t $CO_2$e) when compared with the estimated value (71,364 t $CO_2$e) by PDD.

This difference (21,135 t $CO_2$e) is due to the reduction of nitric acid production generated by many shutdowns motivated by safety trips, maintenance and shutdowns of the adipic acid unit.

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

| | |
|---|---|
| **Project participant and/or responsible person/ entity** | ☒ Project participant<br>☐ Person/entity responsible for completing the CDM-MR-FORM |
| **Organization name** | **Rhodia Energy Brazil Ltda** |
| **Street/P.O. Box** | Av. Maria Coelho Aguiar, 215 - Bloco B - CENESP |
| **Building** | |
| **City** | São Paulo |
| **State/region** | |
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| **Telephone** | +55 19 38 74 85 56 |
| **Fax** | |
| **E-mail** | |
| **Website** | |
| **Contact person** | |
| **Title** | |
| **Salutation** | |
| **Last name** | D’Amore |
| **Middle name** | |
| **First name** | Sérgio |
| **Department** | |
| **Mobile** | |
| **Direct fax** | |
| **Direct tel.** | |
| **Personal e-mail** | sergio.damore@solvay.com |

| | |
|---|---|
| **Project participant and/or responsible person/ entity** | ☒ Project participant<br>☒ Person/entity responsible for completing the CDM-MR-FORM |
| **Organization name** | **Rhodia Energy GHG** |
| **Street/P.O. Box** | 25 Rue de Clichy |
| **Building** | |
| **City** | Paris |
| **State/region** | |
| **Postcode** | 75009 |
| **Country** | France |
| **Telephone** | +33 1 53 56 61 85 |
| **Fax** | |
| **E-mail** | |
| **Website** | |
| **Contact person** | |
| **Title** | |
| **Salutation** | |
| **Last name** | Lee |
| **Middle name** | |
| **First name** | Ju Seung |
| **Department** | |
| **Mobile** | |
| **Direct fax** | |
| **Direct tel.** | |
| **Personal e-mail** | jason.lee@solvay.com |

| Project participant and/or responsible person/ entity | ☒ Project participant<br>☒ Person/entity responsible for completing the CDM-MR-FORM |
|---|---|
| Organization name | **Rhodia Energy GHG SAS** |
| Street/P.O. Box | 25 Rue de Clichy |
| Building | |
| City | Paris |
| State/region | |
| Postcode | 75009 |
| Country | France |
| Telephone | +33 1 53 56 61 85 |
| Fax | |
| E-mail | |
| Website | |
| Contact person | |
| Title | |
| Salutation | |
| Last name | Lee |
| Middle name | |
| First name | Ju Seung |
| Department | |
| Mobile | |
| Direct fax | |
| Direct tel. | |
| Personal e-mail | jason.lee@solvay.com |

| | |
|---|---|
| **Project participant and/or responsible person/ entity** | ☒ Project participant<br>☐ Person/entity responsible for completing the CDM-MR-FORM |
| **Organization name** | **Nordic Environment Finance Corporation** |
| **Street/P.O. Box** | Fabianinkatu 34, P.O.Box 241 |
| **Building** | |
| **City** | Helsinki |
| **State/region** | |
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| **Telephone** | +358 10 618 0664 |
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| **Contact person** | |
| **Title** | |
| **Salutation** | |
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| **Middle name** | |
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## Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 05.1 | 4 May 2015 | Editorial revision to correct version numbering. |
| 05.0 | 1 April 2015 | Revisions to:<br>• Include provisions related to delayed submission of a monitoring plan;<br>• Provisions related to the Host Party;<br>• Remove reference to programme of activities;<br>• Overall editorial improvement. |
| 04.0 | 25 June 2014 | Revisions to:<br>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));<br>• Include provisions related to standardized baselines;<br>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;<br>• Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*;<br>• 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