



## Monitoring report form (Version 03.1)

### Monitoring report

<b>Title of the project activity</b>	"N2O Emission Reduction in Paulínia, SP, Brazil"
<b>Reference number of the project activity</b>	UNFCCC 0116
<b>Version number of the monitoring report</b>	1.1
<b>Completion date of the monitoring report</b>	04/04/2013
<b>Registration date of the project activity</b>	25/12/2005
<b>Monitoring period number and duration of this monitoring period</b>	Monitoring period #58 01/01/2013 to 31/03/2013 (90 days)
<b>Project participant(s)</b>	Rhodia Energy Brazil Ltda. Solvay Energy Services SAS Rhodia Energy GHG SAS Société Générale (withdrawn) ORBEO NATIXIS NATIXIS Environnement & Infrastructure Noble Carbon Credits Limited Rhodia Japan Ltd.
<b>Host Party(ies)</b>	Brazil
<b>Sectoral scope(s) and applied methodology(ies)</b>	Scope 5 Methodology AM0021, Version 1
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	1,412,888 t CO <sub>2</sub> eq
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	1,309,968 t CO <sub>2</sub> eq

**SECTION A. Description of project activity****A.1. Purpose and general description of project activity**

Nitrous oxide (N<sub>2</sub>O) is a by-product of adipic acid production. It is of low toxicity but is a greenhouse gas (GHG), whose GWP is large (GWP=298 considering the Kyoto Protocol (Decision 2/CP.3) and IPCC). Emissions of N<sub>2</sub>O are considered under the Kyoto Protocol and there are no national or regional regulations or restrictions on the emission of N<sub>2</sub>O in Brazil.

In this project, the thermal decomposition process equipment has been added to the adipic acid manufacturing plant. This installation reduces the GHG emissions, which would otherwise be released to the atmosphere if the project was not implemented.

The thermal decomposition facility was installed and commissioned in the manufacturing factory site of Paulínia Rhodia Poliamida e Especialidades Ltda. during October and November 2006 and the destruction of N<sub>2</sub>O was started in 19/11/2006. The N<sub>2</sub>O destruction unit is in continuous operation since its start-up and has only stopped for short periods due to planned and corrective maintenance operations.

In the monitoring period #58 the emission reductions achieved are: 1,309,968 tCO<sub>2</sub>e.

**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 if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (host)	Private entity : Rhodia Energy Brazil Ltda.	No
France	Private entity: Solvay Energy Services SAS Private entity: Rhodia Energy GHG SAS Private entity: Société Générale (withdrawn) Private entity: ORBEO Private entity: NATIXIS	No
United Kingdom of Great Britain and Northern Ireland	Private entity: NATIXIS Environnement & Infrastructures Private entity: NATIXIS Private entity: ORBEO Private entity: Noble Carbon Credits Limited	No
Netherlands	Private entity: ORBEO	No
Japan	Private entity: Rhodia Japan Ltd	No

Switzerland	Private entity: ORBEO; Private entity: Société Générale (withdrawn) Private entity: Rhodia Energy GHG SAS Private entity: Rhodia Japan Ltd.	No
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#### A.4. Reference of applied methodology

AM0021/version 1 – “Baseline Methodology for decomposition of N<sub>2</sub>O from existing adipic acid production plants”

"Tool for the demonstration and assessment of additionality" agreed by the Executive Board (Annex 1, EB16)

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

The length of the crediting period is 21 years.

The first crediting period (on-going) is from 19/11/2006 to 18/11/2013 (renewable 3\*7 years).  
(changed from 01/01/2007 – 31/12/2013)

## SECTION B. Implementation of project activity

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

The project is fully implemented according to the description presented in the PDD. The project activity is completely operational since the start date of operation on 19/11/2006.

A thermal oxidizer with 2 chambers is the technology used to decompose  $N_2O$  at the Rhodia Paulínia site.

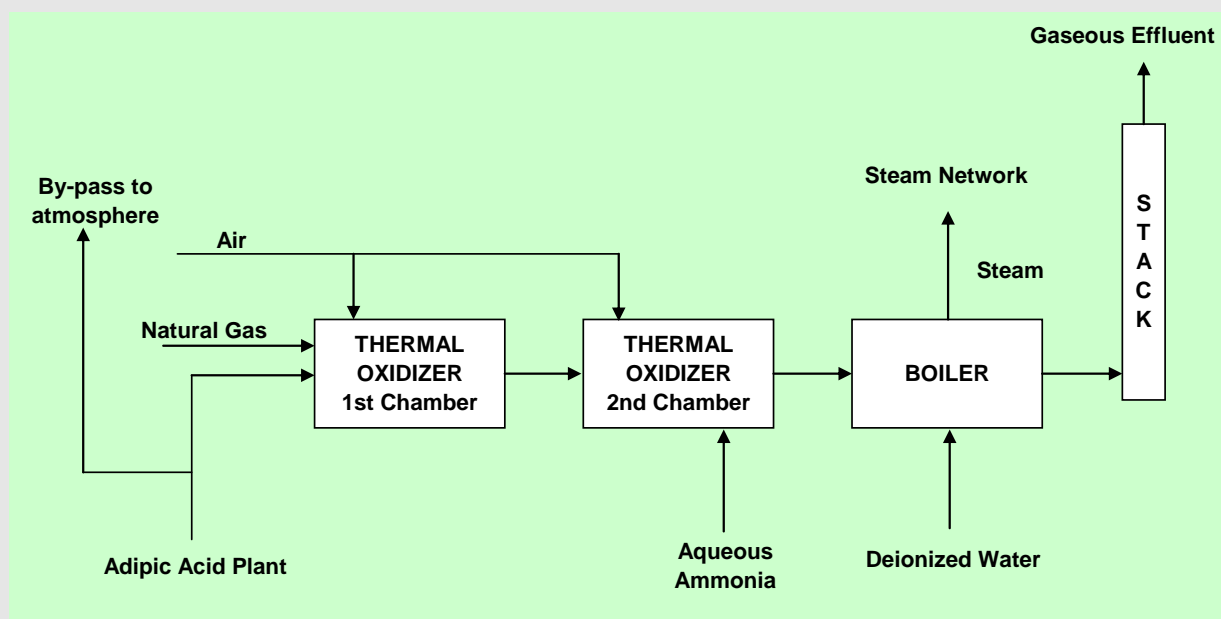
Natural gas is fed with the off gas from the adipic acid production containing  $N_2O$  and a controlled amount of air in a reduction chamber, where it burns (oxidizes) to carbon dioxide ( $CO_2$ ) and water vapour.  $N_2O$  is used as an oxidizer. Being oxygen deficient, the oxidation is not complete and carbon monoxide and hydrogen are present.



The temperature in the furnace is kept at about  $1300^\circ C$  and under fuel rich conditions, so as to promote the complete decomposition of  $N_2O$  while minimizing the formation of unwanted combustion by-products such as  $NO$  and  $NO_2$ .

The gas is then quenched with air to complete the combustion of carbon monoxide and hydrogen at a temperature of about  $950^\circ C$  in a second chamber. Aqueous ammonia is injected to control the emission of  $NO$  and  $NO_2$ .

Before release to the stack, the flue gas coming from the thermal oxidizer is used to produce superheated steam, which is fed into the existing on-site steam network.



During this monitoring period # 58 no particular event occurred that could impact the applicability of the methodology.

During this period, there were two events:

1.  $N_2O$  Unit was disconnected on 28/12/2012 at 8:19 due to a planned shutdown of the Adipic Plant on 27/12/2012 at 10:00. The startup of  $N_2O$  unit was on 07/01/2013 at 22:12 before the adipic acid plant startup, on the same day, at 23:00. Hence, the % online was 100%.
2.  $N_2O$  Unit had a shutdown on 23/01/2013 at 10:00 caused by a safety trip of low level in the boiler (LIS-3472). The reconnection was performed on 23/01/2013 at 23:15, so 24/01/2013 for accounting terms. During this event the AA plant continued running, so the % online was lower than 100%.

**B.2. Post registration changes****B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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. Permanent changes from registered monitoring plan or applied methodology**

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

**B.2.4. 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.2.5. Changes to start date of crediting period**

The initial crediting period date in the validated PDD (01/01/2007 - 31/12/2013) has been modified to 19/11/2006 - 18/11/2013. This change has been approved by the UNFCCC on 19/12/2006.

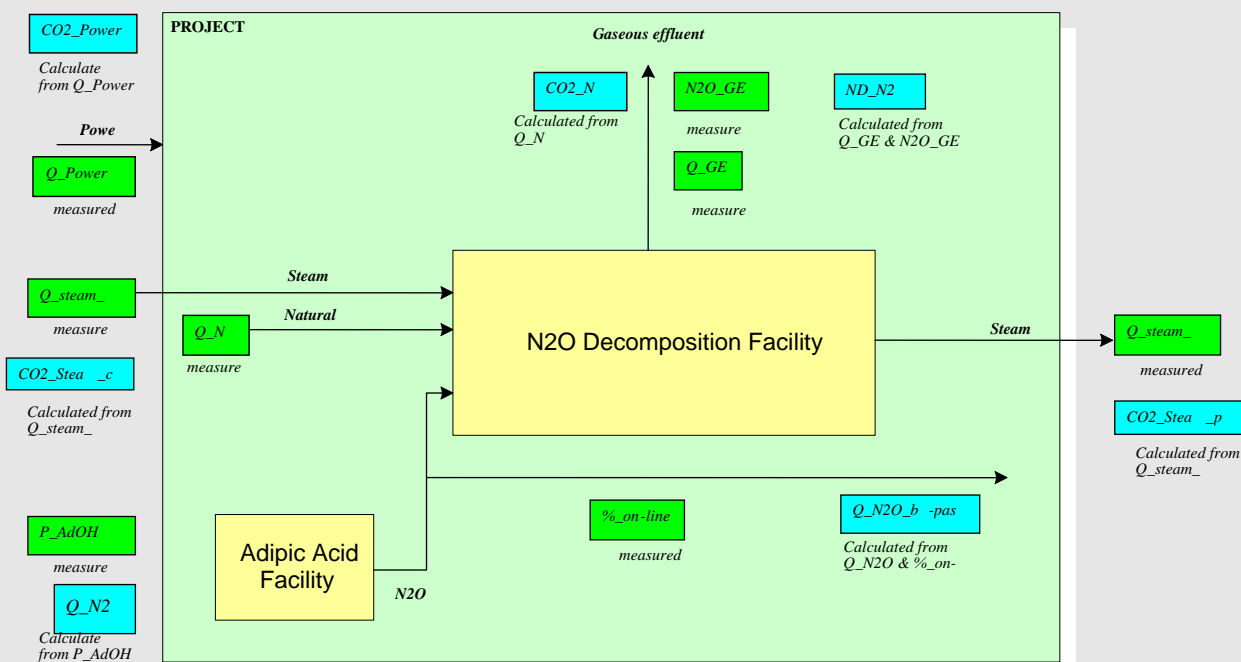
**B.2.6. Types of changes specific to afforestation or reforestation project activity**

Not applicable

## SECTION C. Description of monitoring system

The project boundary related to the baseline methodology is shown below and this project boundary is used and explained in the PDD.

Potential sources of anthropogenic emissions by sources of GHG within the project boundary and emissions which are not included in the project boundary are also shown in below and the details of the parameters are informed in the section D.



All data collection procedures, the organizational structure, the roles 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. Rhodia Paulinia plant is ISO9001 and ISO14001 certified.

The responsibilities of all persons dealing with information and data used to prepare the monitoring report are clearly indicated in the internal quality management system.

The Adipic Acid Plant Manager is responsible for implementing and maintaining the monitoring procedures on site (Data Handling Protocol, training, calibration and maintenance, data review) and for validating all data. The overall responsibility of the project belongs to the CO2 Operations Director of Rhodia Energy GHG located in Paris, France.

All measuring instruments used in this project are calibrated and maintained according to the specifications provided by the manufacturers and/or relevant national and international standards.

All the data used for monitoring the baseline, project and leakage emissions are collected in the PIMS (Plant Information Management System). Two types of data are stored in the PIMS:

(a) Process data (flow rates, pressures, temperatures etc.) are continuously acquired by the DCS (Distributed Control System) and automatically stored by the PIMS;

(b) Packaged dry adipic acid production, slurry production and laboratory analysis used for daily production calculation are obtained from dedicated excel files and are manually entered into the PIMS database every working day by the authorized staff.

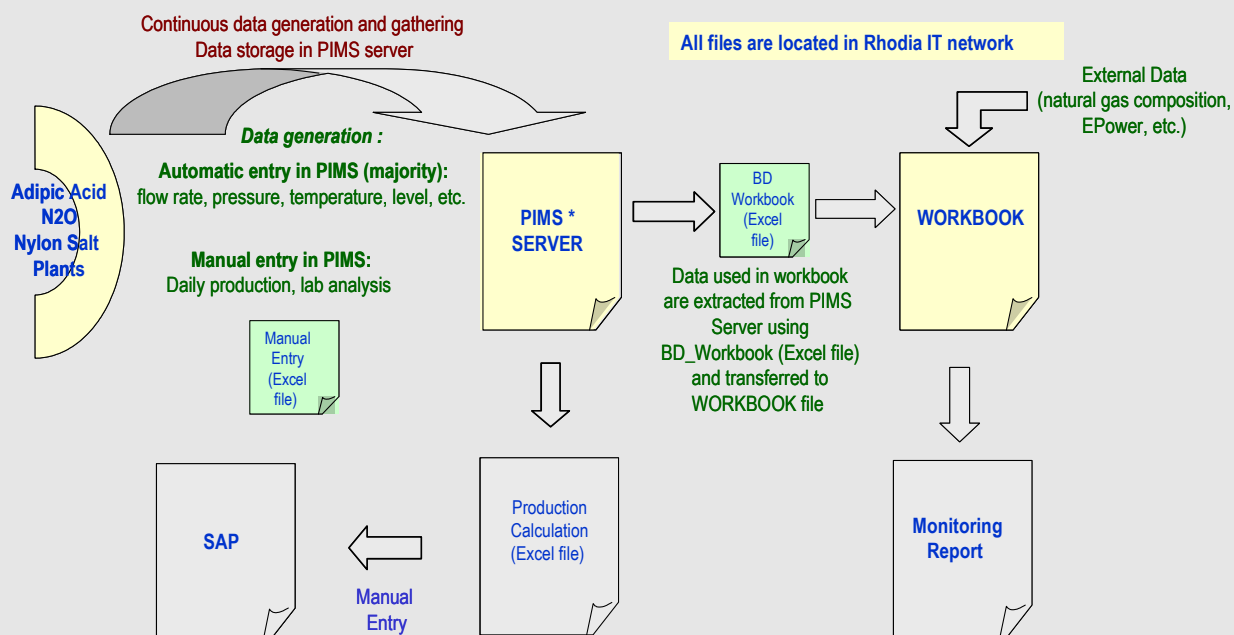
The calculation of the daily production of adipic acid and of the nitric acid consumption is carried out using the data stored in PIMS. The results obtained are transferred to the SAP (System, Applications and products for Data Processing) system which is the official system used by Rhodia for production management and accounting purposes.

The emission reductions calculations are performed in a dedicated excel Workbook. Data are periodically extracted from PIMS using an excel tool and transferred to the Workbook. Some external data are input directly into the Workbook (e.g.: natural gas composition).

The calculations made in the Workbook are used for the preparation of the monitoring report.

The following diagram illustrates the entire process of data acquisition, storage and transfer to the Workbook

and preparation of the monitoring report:



\* PIMS = Plant Information System (Supplier: OSI)

Figure 2. Data Flow Diagram

## SECTION D. Data and parameters

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

<b>Data / Parameter:</b>	<b>GWP_N<sub>2</sub>O</b>
<b>Unit:</b>	tCO <sub>2</sub> e per tN <sub>2</sub> O
<b>Description:</b>	Global Warming Potential of N <sub>2</sub> O
<b>Source of data used</b>	Kyoto Protocol (Decision 2/CP.3) and IPCC
<b>Value(s) applied :</b>	298
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks;
<b>Additional comment:</b>	IPCC <a href="http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14">http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14</a> "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)

<b>Data / Parameter:</b>	<b>KE_N<sub>2</sub>O</b>
<b>Unit:</b>	tN <sub>2</sub> O per tonne of adipic acid produced
<b>Description:</b>	N <sub>2</sub> O Emission factor
<b>Source of data:</b>	IPCC Good Practice Guidance
<b>Value(s) applied:</b>	0.27
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;
<b>Additional Comment:</b>	Cap value for N <sub>2</sub> O_/AdOH emission factor

<b>Data / Parameter:</b>	<b>ΔH</b>
<b>Unit:</b>	kJ/t of steam
<b>Description:</b>	Enthalpy of super heated steam at a pressure level of 40 Bar
<b>Source of data:</b>	Monitoring Plan Section B.3
<b>Value(s) applied:</b>	2,624,000
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;
<b>Additional comment:</b>	Use to calculate E_Steam

<b>Data / Parameter:</b>	<b>η</b>
<b>Unit:</b>	%
<b>Description:</b>	Operational efficiency of the natural gas steam boiler
<b>Source of data:</b>	Monitoring Plan Section B.3
<b>Value(s) applied:</b>	97
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;
<b>Additional Comment:</b>	Not Applicable



**D.2 Data and parameters monitored**

Data / Parameter:	P_AdOH				
Data unit:	Tonnes				
Description:	Amount of adipic acid production				
Measured /Calculated /Default:	Measured				
	Several instruments are used				
Source of data:	DCS data and Production log sheets				
Value(s) of monitored parameter:		From	To	P_AdOH Produced	P_AdOH Eligible*
	Period Value:	01/01/2013	31/03/2013	16,433.562	16,433.562
	Monthly Values:	01/01/2013	31/01/2013	4,779.527	4,779.527
		01/02/2013	28/02/2013	5,658.462	5,658.462
		01/03/2013	31/03/2013	5,995.572	5,995.572
	P_AdOH Current year		24,251		
	P_AdOH Annual Cap:		87,308		
* Adipic acid production for baseline emission calculation, after cap application					
Monitoring equipment	Equipment	Type	Accuracy class	Calibration frequency	Calibration Information
	Packaging machine (Z-3110) Serial Number 6046	Load cell 50 kg	+/- 0.02 kg	1/month	Last calibration
					14/03/2013
					Valid until
					13/04/2013
	Packaging machine (G-2532) Serial Number 10869A	Load cell 100 kg	+/- 0.02 kg	1/month	Last calibration
					14/03/2013
					Valid until
					13/04/2013
	Weigh scale (Z-3120) Serial Number 104BA4	Load cell 1,000 kg	+/- 0.5 kg	4/year	Last calibration
					14/02/2013
					Valid until
					13/05/2013
	Truck weigh scale (BB-0090) Serial Number 7597	Load cell 80,000 kg	+/- 15 kg	2/year	Last calibration
					10/03/2013
					Valid until
					09/09/2013
	Truck weigh scale (BB-0335) Serial Number 28812	Load cell 80,000 kg	+/- 15 kg	2/year	Last calibration
					17/03/2013
					Valid until
16/09/2013					
Level tank R-5300 (LT-4500) Serial Number U505269	Pressure bubbling level – differential. Pressure	+/- 0.075 %	1/year	Last calibration	
				06/11/2012	
				Valid until	
				05/11/2013	

	Level tank R-5310 (LT-4509) Serial Number U308909	Pressure bubbling level – differential Pressure	+/- 0.075 %	1/year	Last calibration
					18/02/2013
					Valid until
					17/02/2014
	Lab equipment RFM-340 Serial Number BT99344	Refractometer	+/- 0.02 %	1/week (Rhodia verification)	Last calibration
					28/03/2013
					Valid until
					following week
				2/year (Third party calibration)	Last calibration
					06/02/2013
					Valid until
					05/08/2013
	Level tank RE-2422 (LI-2422) Serial Number 91F345706 611 from 01/01/2013 to 02/01/2013	Pressure insufflation level Differential pressure	+/- 0.065 %	1/year	Last calibration
					17/08/2012
					Valid until
					16/08/2013
	Level tank RE-2422 (LI-2422) Serial Number F120000000153 996 from 02/01/2013 to 19/02/2013	Radar	+/-0.03	1/year	Last calibration
					05/12/2012
					Valid until
					04/12/2013
	Level tank RE-2422 (LI-2422) Serial Number 91F345706 611 from 19/02/2013 to 25/03/2013	Pressure insufflation level Differential pressure	+/- 0.065 %	1/year	Last calibration
					17/08/2012
					Valid until
					16/08/2013
	Level tank RE-2422 (LI-2422) Serial Number F120000000153 996 as of 25/03/2013	Radar	+/-0.03	1/year	Last calibration
					05/12/2012
Valid until					
04/12/2013					
Measuring/ Reading/ Recording frequency:	Measured and recorded daily/Aggregated monthly and yearly				

<b>Calculation method (if applicable):</b>	<p>The daily adipic acid production is the sum of the dry adipic acid + slurry adipic acid used in the Nylon salt production + the in-process inventory variation. This calculation is automatically performed in the PIMS every day at 5:00 p.m. From the PIMS data bank the daily production is automatically extracted using an Excel file and is manually input into the SAP.</p> <p>The dry adipic acid is the product packed determined by weigh scales.</p> <p>The slurry adipic acid cannot be measured directly. In accordance with the EB guidance issued in the 45th EB meeting the production of slurry adipic acid is obtained by multiplying the Nylon Salt produced by the ratio 0.55748 between adipic acid and Nylon Salt, consistent with the steady composition of the Nylon Salt (reflected by a constant and precise value of the pH).</p> <p>The Nylon Salt produced is measured by weigh scales of trucks and inventory variation of the Nylon Salt.</p> <p>The cumulated production of Adipic acid over the current year (starting last November 19th and ending with the last day of this period) is below the cap value of 87,308 tonnes as stated by the EB 47th meeting decision.</p> <p>The value of 87,308 tonnes was calculated in the Validation Report as the maximum daily production in 2004 x 365 x the operational rate (260 t/day x 365 x 92%) which is consistent with the clarification of EB 48th meeting report §24 of 17/07/2009.</p> <p>The Executive Board has confirmed on EB36 the application of a yearly Adipic acid production cap as required by the methodology. This approach is consistent with the definitions and requirements of the "Guidance on accounting eligible HFC-23" AM0001 (EB39 Annex 8): the year of the crediting period is defined on the basis of the starting date of the crediting period of a project activity (November 19th); the current period ends on November 18th, which is the end date of the year of the crediting period.</p> <p>The overall accuracy on P_AdOH is calculated, sheet UC_AdOH, and was found to be around 0.18% which is consistent with the PDD requirement of +/- 1%.</p>
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks;
<b>Additional Comment:</b>	

Data / Parameter:	Nitric acid consumption (HNO3_consumption)				
Data unit:	tonnes				
Description:	Nitric acid consumption for the calculation of HNO <sub>3</sub> chemical				
Measured /Calculated /Default:	Measured Several instruments are used				
Source of data	DCS data and Production log sheets				
Value(s) of monitored parameter:			HNO3_consumption		
	Rolling year	31/03/2013	54,046		
	From	To			
	01/01/2013	31/01/2013	4,357		
	01/02/2013	28/02/2013	5,103		
	01/03/2013	31/03/2013	5,334		
Monitoring equipment	Equipment	Type	Accuracy class	Calibration frequency	Calibration Information
	Nitric acid mass flow meter (FQ-2179) Serial number 12000364 3748161	Mass flow meter	+/- 0.1 %	2 years	Last calibration
					03/01/2013
					Valid until
					02/01/2015
	Fresh nitric acid concentration analyzer (AI-2179) Serial number 12000364 3748161	Device integrated to mass flow meter FQ-2179	+/- 0.5 %	2 years	Last calibration
					03/01/2013
					Valid until
					02/01/2015
	Level of nitric acid storage tank F-1769 (LI-3350) Serial number 91F345787-611	Air bubble gauge (back-up from FQ-2179)	+/- 0.065 %	1/year	Last calibration
					26/02/2013
					Valid until
					25/02/2014
	Flow meter of fresh nitric acid to storage (FQ-3318) Serial number 880162188 (Flow meter) 0304645 (Transmitter) installed from 28/11/2012 to 12/03/2013	Magnetic Flow Meter (back-up from FQ-2179)	+/- 1 %	1/year	Last calibration
					08/10/2012
					Valid until
					07/10/2013

	Flow meter of fresh nitric acid to storage (FQ-3318) Serial number 07FMC2013 (Flowmeter) 07TMC203 (Transmitter) installed as of 12/03/2013	Magnetic Flow Meter (back-up from FQ-2179)	+/- 1 %	1/year	Last calibration
					26/02/2013
					Valid until
					25/02/2014
<b>Measuring/ Reading/ Recording frequency:</b>	Measured continuously and recorded daily/Aggregated monthly and yearly				
<b>Calculation method (if applicable):</b>	The nitric acid consumption is based upon the quantity of nitric acid fed to the adipic acid plant during given period and the holding volume and concentration of the process storage tanks (mother acid tank, Oxidation acid tank, Concentration acid tank), which is obtained directly from the DCS and stored at PIMS data base.				
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	<b>Physical losses in the adipic acid production process (HNO<sub>3</sub>_physical)</b>				
<b>Data unit:</b>	tonnes				
<b>Description:</b>	Physical losses in the adipic acid production process data required for calculation of HNO <sub>3</sub> chemical and the N <sub>2</sub> O emission factor N <sub>2</sub> O_AdOH				
<b>Measured /Calculated /Default:</b>	Measured Several instruments are used				
<b>Source of data</b>	DCS data and lab data				
<b>Value(s) of monitored parameter:</b>			HNO <sub>3</sub> _physical		
	Rolling year	31/03/2013	882		
	From	To			
	01/01/2013	31/01/2013	47		
	01/02/2013	28/02/2013	59		
	01/03/2013	31/03/2013	86		
<b>Monitoring equipment</b>	<b>Equipment</b>	<b>Type</b>	<b>Accuracy class</b>	<b>Calibration frequency</b>	<b>Calibration Information</b>
	Flow meter of effluent to biological WWT (FQ-2973) Serial number 91F321071-608	Orifice plate flow - Differential pressure	+/- 0.60 %	1/year	Last calibration
					11/07/2012
					Valid until
					10/07/2013

	Flow meter of effluent to neutralization (FQ-2974) Serial Number 91F321074-608	Orifice plate flow - Differential pressure	+/- 0.85 %	1/year	Last calibration
					11/07/2012
					Valid until
					10/07/2013
	Waste gas flow meter (FQ-3450) Serial Number 91G511075-720	Orifice plate flow - Multivariable transmitter	+/- 1.6 %	1/year	Last calibration
					21/11/2012
					Valid until
					20/11/2013
	Waste gas flow meter (FIC-3401) Serial Number JEJAAR772-625	Pitot tube flow meter - Differential pressure (back-up from FQ-3450)	+/- 1.45 %	1/year	Last calibration
					26/09/2012
					Valid until
					25/09/2013
	Nitric analyzer on effluent to neutralization (AI-2974) Serial Number 45201	pHmeter	+/- 0.05 %	2/month	Last calibration
					21/03/2013
					Valid until
					Following 15 days
	Nitric analyzer on effluent to neutralization (AI-2974B) Serial number 39237	pHmeter (back-up from AI-2974)	+/- 0.07 %	2/month	Last calibration
					28/03/2013
					Valid until
					Following 15 days
	NOx Analyzer (AI-2195AB) Serial Number 400561459533	Gas Analyzer - infrared and ultraviolet NOx measurement Sum of AI-2195A (NO) and AI-2195B (NO <sub>2</sub> )	+/- <1 %	1/week (Rhodia calibration)	Last calibration
					28/03/2013
					Valid until
					Following week
				2/year (Third party preventive maintenance and calibration)	Last calibration
					12/03/2013
					Valid until
					11/09/2013
Measuring/ Reading/ Recording frequency:	Measured continuously and recorded daily/Aggregated monthly and yearly.				

<b>Calculation method (if applicable):</b>	Physical losses (HNO <sub>3</sub> _physical) are calculated as the sum of the losses of nitric acid or its derivatives in the aqueous wastes, the off gases, the adipic acid product (impurity) and the by-products				
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	<b>HNO<sub>3</sub>_Chemical</b>				
<b>Data unit:</b>	tonnes				
<b>Description:</b>	Chemical consumption of Nitric acid required for the calculation of the N <sub>2</sub> O emission factor N <sub>2</sub> O_AdOH				
<b>Measured /Calculated /Default:</b>	Calculated				
<b>Source of data</b>	Excel Workbook based on HNO <sub>3</sub> _consumption and HNO <sub>3</sub> _physical				
<b>Value(s) of monitored parameter:</b>			HNO <sub>3</sub> _consumption	HNO <sub>3</sub> _physical	HNO <sub>3</sub> _chemical
	Rolling year	31/03/2013	54,046	882	53,164
	From	To			
	01/01/2013	31/01/2013	4,357	47	4,310
	01/02/2013	28/02/2013	5,103	59	5,044
	01/03/2013	31/03/2013	5,334	86	5,248
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Calculated and recorded monthly and yearly				
<b>Calculation method (if applicable):</b>	To obtain the chemical consumption (HNO <sub>3</sub> _chemical), the physical losses are deducted from the nitric acid consumption. HNO <sub>3</sub> _chemical = HNO <sub>3</sub> _consumption - HNO <sub>3</sub> _physical				
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	<b>N<sub>2</sub>O_/AdOH</b>				
<b>Data unit:</b>	t N <sub>2</sub> O/t adipic acid				
<b>Description:</b>	Actual N <sub>2</sub> O emission factor for adipic acid production				
<b>Measured /Calculated /Default:</b>	Calculated				
<b>Source of data:</b>	Excel Workbook based on HNO <sub>3</sub> chemical and P_AdOH				

	Period or Month	N <sub>2</sub> O_/AdOH (Calculated for month/period)	N <sub>2</sub> O_/AdOH (Calculated for rolling year)	N <sub>2</sub> O_/AdOH (Applied for baseline emissions)	N <sub>2</sub> O_/AdOH (Applied for project emissions)
<b>Value(s) of monitored parameter:</b>	01/01/2013 31/03/2013	0.298	0.296	0.270	0.298
	01/01/2013 31/01/2013	0.302	0.296	0.270	0.302
	01/02/2013 28/02/2013	0.299	0.297	0.270	0.299
	01/03/2013 31/03/2013	0.293	0.296	0.270	0.296
	The calculation of the by-pass emissions uses the monthly values of the emission factor N <sub>2</sub> O_/AdOH applied for project emissions. The by-pass emissions for the period are calculated as the sum of the monthly values, and do not use the N <sub>2</sub> O_/AdOH value of the period, given here for information only.				
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Recorded monthly and yearly				
<b>Calculation method (if applicable):</b>	<p>The N<sub>2</sub>O emission factor is calculated in two ways:</p> <p>(1) with the month/period values of HNO<sub>3</sub>_chemical and P_AdOH</p> <p>(2) using the rolling year cumulated data of HNO<sub>3</sub>_chemical and P_AdOH</p> <p>The formula used according to AM0021/version 1 equation (4) is:</p> $N_2O\_AdOH = HNO_3\_chemical / P\_AdOH / 63 / 2 \times 0.96 \times 44$ <p>For Baseline Emissions, the lowest among the 2 above calculated values and 0.27 is used conservatively, as specified in the PDD table D.2.1.3 and required by the methodology AM0021/version 1 (page 4).</p> <p>To be conservative, the highest value of the three (two calculated values and 0.27) is applied to calculate Q_N<sub>2</sub>O_by-pass (see this parameter for details)</p>				
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	Q_N <sub>2</sub> O				
<b>Data unit:</b>	kg				
<b>Description:</b>	Quantity of N <sub>2</sub> O produced				
<b>Measured /Calculated /Default:</b>	Calculated value				
<b>Source of data:</b>	Excel Workbook based on P_AdOH and N <sub>2</sub> O_/AdOH data				



<b>Value(s) of monitored parameter:</b>		From	To	Q_N <sub>2</sub> O	
	Period Value:	01/01/2013	31/03/2013	4,437,060	
	Monthly Values:	01/01/2013	31/01/2013	1,290,472	
		01/02/2013	28/02/2013	1,527,784	
		01/03/2013	31/03/2013	1,618,804	
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Recorded monthly				
<b>Calculation method (if applicable):</b>	$Q_{N_2O} = P_{AdOH} \times N_2O_{reg} / AdOH$ Only the adipic acid production after cap application is used to determine the baseline emission				
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	<b>Q_N<sub>2</sub>O reg</b>				
<b>Data unit:</b>	kg				
<b>Description:</b>	Allowed N <sub>2</sub> O emission				
<b>Measured /Calculated /Default:</b>	Default value				
<b>Source of data:</b>	Brazilian legislation				
<b>Value(s) of monitored parameter:</b>	Not applicable				
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	At date of the regulatory value introduction or change of the regulation				
<b>Calculation method (if applicable):</b>	Not applicable				
<b>QA/QC procedures:</b>	Rhodia follows the evolution of Brazilian legislation about N <sub>2</sub> O emissions that could affect the project Emission Reduction through the parameters N <sub>2</sub> O <sub>reg</sub> / AdOH, Q_N <sub>2</sub> O reg, or ry as part of the ISO 14000 requirements. Experts on environmental matters from Rhodia Brazil follow closely any project or change in the laws and regulations. They participate in external organizations such as ABIQUIM (Brazilian Association of Chemical Industries) and meetings organized by CETESB (local environmental agency).				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;				
<b>Additional Comment:</b>					

<b>Data / Parameter:</b>	<b>N<sub>2</sub>O reg/AdOH</b>
<b>Data unit:</b>	kg/kg
<b>Description:</b>	kg of allowed N <sub>2</sub> O emission / kg of adipic acid produced
<b>Measured /Calculated /Default:</b>	Default value
<b>Source of data:</b>	Brazilian legislation
<b>Value(s) of monitored parameter:</b>	Not applicable
<b>Monitoring equipment</b>	Not applicable
<b>Measuring/ Reading/ Recording frequency:</b>	At date of the regulatory value introduction or change of the regulation
<b>Calculation method (if applicable):</b>	Not applicable
<b>QA/QC procedures:</b>	Rhodia follows the evolution of Brazilian legislation about N <sub>2</sub> O emissions that could affect the project Emission Reduction through the parameters N <sub>2</sub> O_reg / AdOH, Q_N <sub>2</sub> O reg, or ry as part of the ISO 14000 requirements. Experts on environmental matters from Rhodia Brazil follow closely any project or change in the laws and regulations. They participate in external organizations such as ABIQUIM (Brazilian Association of Chemical Industries) and meetings organized by CETESB (local environmental agency).
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;
<b>Additional Comment:</b>	

<b>Data / Parameter:</b>	<b>r<sub>y</sub></b>
<b>Data unit:</b>	%
<b>Description:</b>	Share of N <sub>2</sub> O emissions required to be destroyed
<b>Measured /Calculated /Default:</b>	Default value
<b>Source of data:</b>	Brazilian legislation
<b>Value(s) of monitored parameter:</b>	Not applicable
<b>Data used for:</b>	Baseline Emissions
<b>Monitoring equipment</b>	Not applicable
<b>Measuring/ Reading/ Recording frequency:</b>	At date of the regulatory value introduction or change of the regulation
<b>Calculation method (if applicable):</b>	Not applicable

<b>QA/QC procedures:</b>	Rhodia follows the evolution of Brazilian legislation about N <sub>2</sub> O emissions that could affect the project Emission Reduction through the parameters N <sub>2</sub> O <sub>reg</sub> / AdOH, Q <sub>N<sub>2</sub>O</sub> reg, or ry as part of the ISO 14000 requirements. Experts on environmental matters from Rhodia Brazil follow closely any project or change in the laws and regulations. They participate in external organizations such as ABIQUIM (Brazilian Association of Chemical Industries) and meetings organized by CETESB (local environmental agency).
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;
<b>Additional Comment:</b>	

<b>Data / Parameter:</b>	<b>P N<sub>2</sub>O</b>
<b>Data unit:</b>	€/t
<b>Description:</b>	Market price of N <sub>2</sub> O
<b>Measured /Calculated /Default:</b>	Estimated
<b>Source of data:</b>	Market Survey (last up-date August 2012)
<b>Value(s) of monitored parameter:</b>	Zero (0) (there is no N <sub>2</sub> O market for the N <sub>2</sub> O produced as by-product of adipic acid in Paulinia)
<b>Monitoring equipment</b>	Not applicable
<b>Measuring/ Reading/ Recording frequency:</b>	Annual update based on permanent market survey
<b>Calculation method (if applicable):</b>	Not applicable
<b>QA/QC procedures:</b>	Not applicable
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;
<b>Additional Comment:</b>	

Data / Parameter:	Q_Steam_p				
Data unit:	kg of steam				
Description:	Amount of steam produced by the decomposition process				
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:		From	To	Q_Steam_p	
	Period Value:	01/01/2013	31/03/2013	19,462,300	
	Monthly Values:	01/01/2013	31/01/2013	5,655,900	
		01/02/2013	28/02/2013	6,610,800	
		01/03/2013	31/03/2013	7,195,600	

Monitoring equipment	Equipment	Type	Accuracy class	Calibration frequency	Calibration Information
	40 bar steam flow meter (FQ-3470) Serial number 7072986	Orifice plate flow – Multi variable transmitter	+/- 1.2 %	1/year	Last calibration
					11/09/2012
					Valid until
					10/09/2013
	Boiler feed water flow meter (FQ-3410) Serial number 91F348990612	Orifice plate flow - Differential pressure (back-up from FQ-3470)	+/- 0.65 %	1/year	Last calibration
					10/09/2012
					Valid until
09/09/2013					
Measuring/ Reading/ Recording frequency:	Measured continuously and recorded daily/Aggregated monthly				
Calculation method (if applicable):	Not applicable				
QA/QC procedures:	Data Handling Protocol - ISAL-ADOH-QA-007				
Purpose of data:	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;				
Additional Comment:					
-					
Data / Parameter:	E_Steam				
Data unit:	kg CO <sub>2</sub> /kg of steam				
Description:	CO <sub>2</sub> emission factor of steam produced by facility				
Measured /Calculated /Default:	Calculated				
Source of data:	Excel Workbook based on QNG_tsteam and E_NG				
Value(s) of monitored parameter:	0.144				
Monitoring equipment	Not applicable				
Measuring/ Reading/ Recording frequency:	Measuring not applicable/ Updated for each monitoring period				
Calculation method (if applicable):	<p>The rolling year value of E_Steam is calculated with the data available for the 12 months prior to the beginning of the period in order to assure to have the data. The emission factor is obtained by the formula below:</p> $E\_Steam = (QNG\_tsteam/1,000) * E\_NGy$ $QNG\_steam = \Delta H \text{ (kJ/t)} / (LHV \text{ (kJ/Nm}^3\text{)} \times \eta \text{ (\%)})$ <p>Where:</p> <p>QNG_steam: amount of natural gas required to generate steam (Nm<sup>3</sup>/t)</p> <p>The LHV data is the yearly average value for the gas supplied by COMGAS.</p> <p>The yield <math>\eta</math> (%) of the boiler is conservatively taken as 97%, while the yield is generally below 90%</p>				

	E_NGy: yearly average value for the gas supplied by COMGAS (kg CO <sub>2</sub> /Nm <sup>3</sup> )				
	Year Ending on: 01/01/2013				
	LHV kJ/Nm <sup>3</sup>	ΔH kJ/t	η %	QNG <sub>tsteam</sub> Nm <sup>3</sup> /t of steam	E_NGy kg-CO <sub>2</sub> /Nm <sup>3</sup>
	38,643	2,624,000	97	65.87	2.199
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;				
<b>Additional Comment:</b>					

<b>Data / Parameter:</b>	<b>CO<sub>2</sub>_Steam_p</b>				
<b>Data unit:</b>	t CO <sub>2</sub> e				
<b>Description:</b>	CO <sub>2</sub> Emissions from Steam Production				
<b>Measured /Calculated /Default:</b>	Calculated				
<b>Source of data:</b>	Excel Workbook based on Q_Steam_p and E_Steam data				
<b>Value(s) of monitored parameter:</b>		From	To	CO <sub>2</sub> _Steam_p	
	Period Value:	01/01/2013	31/03/2013	2,801	
	Monthly Values:	01/01/2013	31/01/2013	814	
		01/02/2013	28/02/2013	951	
		01/03/2013	31/03/2013	1,036	
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Calculated monthly				
<b>Calculation method (if applicable):</b>	Calculated monthly and expressed in tonnes, using Q_Steam_p and E_Steam CO <sub>2</sub> _Steam_p = Q_Steam_p x E_Steam				
<b>QA/QC procedures:</b>	Data Handling Protocol - ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(a) Calculation of baseline emissions or baseline net GHG removals by sinks;				
<b>Additional Comment:</b>					

<b>Data / Parameter:</b>	<b>Q_GE</b>
<b>Data unit:</b>	Nm <sup>3</sup>
<b>Description:</b>	Volume of effluent gas leaving the stack
<b>Measured /Calculated /Default:</b>	Measured
<b>Source of data:</b>	The data are automatically acquired continuously by DCS and stored in the PIMS

<b>Value(s) of monitored parameter:</b>		From	To	Q_GE	
	Period Value:	01/01/2013	31/03/2013	33,316,348	
	Monthly Values:	01/01/2013	31/01/2013	10,629,212	
		01/02/2013	28/02/2013	10,590,248	
		01/03/2013	31/03/2013	12,096,888	
<b>Monitoring equipment</b>	<b>Equipment</b>	<b>Type</b>	<b>Accuracy class</b>	<b>Calibration frequency</b>	<b>Calibration Information</b>
	Gas flow meter (FQ-3490) Serial number 7072985	Annubar gas flow meter-Multivariable transmitter on wet basis	+/- 2.5 %	1/year	Last calibration
					12/09/2012
					Valid until
					11/09/2013
<b>Measuring/ Reading/ Recording frequency:</b>	Measured continuously and recorded daily/Aggregated monthly				
<b>Calculation method (if applicable):</b>	Not applicable				
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					

<b>Data / Parameter:</b>	<b>N<sub>2</sub>O_GE</b>				
<b>Data unit:</b>	vppm				
<b>Description:</b>	Concentration of N <sub>2</sub> O in the effluent gas				
<b>Measured /Calculated /Default:</b>	Measured				
<b>Source of data:</b>	The data are automatically acquired continuously by DCS and stored in the PIMS				
<b>Value(s) of monitored parameter:</b>		From	To	N <sub>2</sub> O_GE	
	Period Value:	01/01/2013	31/03/2013	16.0	
	Monthly Values:	01/01/2013	31/01/2013	19.2	
		01/02/2013	28/02/2013	14.4	
		01/03/2013	31/03/2013	14.7	
<b>Monitoring equipment</b>	<b>Equipment</b>	<b>Type</b>	<b>Accuracy class</b>	<b>Calibration frequency</b>	<b>Calibration Information</b>
	N <sub>2</sub> O analyzer (AI-3490B) Serial number 17008	Gas analyzer, type in-situ and laser diode on wet basis	+/- 5 % of reading	2/year	Last calibration
					28/03/2012
					Valid until
					27/09/2012
	N <sub>2</sub> O analyzer (AI-3490G) Serial number 450561464363	Back-up Analyzer Gas analyzer, type extractive and infrared	+/- <1.0 %	1/week (Rhodia calibration)	Last calibration
					28/03/2013
					Valid until
					following week

				2/year (Third party preventive maintenance and calibration)	Last calibration
					14/03/2013
					Valid until
					13/09/2013
<b>Measuring/ Reading/ Recording frequency:</b>	Measured continuously and recorded daily/Aggregated monthly				
<b>Calculation method (if applicable):</b>	<p>The daily average concentration on wet basis is calculated in the DCS as the flow averaged value of instantaneous concentration values measured every 10 sec:</p> $N_2O\_GE = \Sigma (Q\_GE \times N_2O\_GE) / Q\_GE$				
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	ND_N <sub>2</sub> O				
<b>Data unit:</b>	kg				
<b>Description:</b>	Quantity of N <sub>2</sub> O in the effluent gas leaving the stack				
<b>Measured /Calculated /Default:</b>	Calculated				
<b>Source of data:</b>	The data are automatically acquired continuously by DCS and stored in the PIMS				
<b>Value(s) of monitored parameter:</b>		From	To	ND_N <sub>2</sub> O	
	Period Value:	01/01/2013	31/03/2013	1,050	
	Monthly Values:	01/01/2013	31/01/2013	401	
		01/02/2013	28/02/2013	300	
		01/03/2013	31/03/2013	349	
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Measured continuously and recorded daily/Aggregated monthly				
<b>Calculation method (if applicable):</b>	<p>The daily value of non destroyed N<sub>2</sub>O (N<sub>2</sub>O_ND) is calculated on-line in the DCS by integrating the product of the instantaneous concentration of N<sub>2</sub>O by the flow rate of the gaseous effluent, both measured on a wet basis (Method C of EB61 – “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”) :</p> $ND\_N_2O = Q\_GE \times N_2O\_GE \times Specific\_gravity\_of\_N_2O$ <p>The specific gravity of N<sub>2</sub>O = 44/22.414 x 10<sup>-6</sup> is used to transform vppm in kg/Nm<sup>3</sup></p> <p>When the instant value indicated by AI-3490B is lower than 5 vppm (detection limit), the value of 5 vppm is used in the equation above.</p>				
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					

Data / Parameter:	Q_NG				
Data unit:	Nm <sup>3</sup>				
Description:	Amount of natural gas used by the decomposition process				
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:		From	To	Q_NG	
	Period Value:	01/01/2013	31/03/2013	1,605,544	
	Monthly Values:	01/01/2013	31/01/2013	491,820	
		01/02/2013	28/02/2013	531,868	
		01/03/2013	31/03/2013	581,856	
Monitoring equipment	Equipment	Type	Accuracy class	Calibration frequency	Date of last calibration
	Gas flow meter (FQ-3408) Serial number IB-2298	Gas flow meter	+/- 0.5 %	2 years	Last calibration
					29/02/2012
					Valid until
					27/02/2014
	Gas flow meter (FQ-3460) (back-up from FQ-3408) Serial number IB-2095	Gas flow meter	+/- 0.5 %	2 years	Last calibration
					03/10/2011
					Valid until
					02/10/2013
Measuring/ Reading/ Recording frequency:	Measured continuously and recorded daily/Aggregated monthly				
Calculation method (if applicable):	Not applicable				
QA/QC procedures:	Data Handling Protocol ISAL-ADOH-QA-007				
Purpose of data:	(b) Calculation of project emissions or actual net GHG removals by sinks;				
Additional Comment:					

<b>Data / Parameter:</b>	<b>E_NGy</b>
<b>Data unit:</b>	kg CO <sub>2</sub> /Nm <sup>3</sup>
<b>Description:</b>	Emissions coefficient for natural gas combustion
<b>Measured /Calculated /Default:</b>	Calculated
<b>Source of data:</b>	Excel Workbook based on NGC
<b>Value(s) of monitored parameter:</b>	2.199



<b>Monitoring equipment</b>	Not applicable
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Updated each period
<b>Calculation method (if applicable):</b>	The emissions coefficient is calculated according to the PDD Monitoring Plan. For the 12 months preceding the monitoring period, the CO <sub>2</sub> quantity emitted by the combustion of the natural gas from all the gas boilers is summed up and divided by the total quantity of natural gas consumed in Nm <sup>3</sup> over the same 12 months period. The CO <sub>2</sub> quantity emitted is obtained by multiplying the emission factor of the month (based on the gas composition of the month) by the quantity of natural gas burned in the same month, using the formulae described in section E1 of the PDD.
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007
<b>Purpose of data:</b>	(b) Calculation of project emissions or actual net GHG removals by sinks;
<b>Additional Comment:</b>	

<b>Data / Parameter:</b>	NGC				
<b>Data unit:</b>	% vol				
<b>Description:</b>	Natural gas composition required for the calculation of E <sub>NG</sub>				
<b>Measured /Calculated /Default:</b>	Measured by COMGAS (supplier company)				
<b>Source of data:</b>	Natural gas supplier COMGAS				
<b>Value(s) of monitored parameter:</b>	<b>Component</b>	<b>Number of C</b>	<b>Jan-13</b>	<b>Feb-13</b>	<b>Mar-13</b>
	CH <sub>4</sub> (Methane)	1	89.25	89.43	88.30
	C <sub>2</sub> H <sub>6</sub> (Ethane)	2	5.78	5.65	6.35
	C <sub>3</sub> H <sub>8</sub> (Propane)	3	1.83	1.81	1.99
	I-C <sub>4</sub> H <sub>10</sub> (i-Isobutane)	4	0.29	0.28	0.29
	N-C <sub>4</sub> H <sub>10</sub> (n-Butane)	4	0.39	0.40	0.42
	C <sub>5</sub> H <sub>12</sub> (i-Pentane)	5	0.12	0.12	0.12
	C <sub>5</sub> H <sub>12</sub> (n-Pentane)	5	0.09	0.10	0.08
	C <sub>6</sub> H <sub>14</sub> (Hexane)	6	0.07	0.07	0.10
	N <sub>2</sub> (Nitrogen)	0	0.73	0.75	0.76
	CO <sub>2</sub> (Carbon dioxide)	1	1.45	1.38	1.58
	Average number of C		1.12	1.12	1.13
	<b>E<sub>NGm</sub> (kg CO<sub>2</sub>/Nm<sup>3</sup>)</b>		2.200	2.197	2.222

<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Recorded monthly				
<b>Calculation method (if applicable):</b>	<p>NGC is use to calculate the E_NG monthly value. The average number of C in a mole of NG is calculated from the composition = <math>\Sigma</math> (number of C in each mole) x (volume ratio). The CO<sub>2</sub> specific gravity in normal conditions is 1.965 kg/Nm<sup>3</sup>.</p> <p><math>E_{NG} = 1.965 \times (\text{average number of C})</math></p> <p>For this monitoring period, natural gas composition from March 2013 is not yet available, so to be conservative, the NGC of the month of August 2008 was used for March as it gives the highest E_NG value since the beginning of the crediting period (19/11/2006).</p>				
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	CO <sub>2</sub> _NG				
<b>Data unit:</b>	t CO <sub>2</sub>				
<b>Description:</b>	CO <sub>2</sub> Emissions for Natural Gas				
<b>Measured /Calculated /Default:</b>	Calculated				
<b>Source of data:</b>	Excel Workbook calculated from Q_NG and E_NG				
<b>Value(s) of monitored parameter:</b>		From	To	CO <sub>2</sub> _NG	
	Period Value:	01/01/2013	31/03/2013	3,545	
	Monthly values:	01/01/2013	31/01/2013	1,083	
		01/02/2013	28/02/2013	1,169	
		01/03/2013	31/03/2013	1,293	
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Calculated monthly				
<b>Calculation method (if applicable):</b>	<p>CO<sub>2</sub>_NG is calculated monthly and expressed in tonnes using the monthly values of Q_NG and E_NG</p> <p><math>CO_{2\_NG_m} = Q_{NG_m} \times E_{NG_m}</math></p> <p>The value of the period is the sum of the monthly values of the period</p>				
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	%_on-line				
<b>Data unit:</b>	% of production time				

Description:	% of production time that N2O is feeding the destruction facility				
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:		From	To	%_on-line	
	Period Value:	01/01/2013	31/03/2013	99.2392	
	Monthly Values:	01/01/2013	31/01/2013	97.3925	
		01/02/2013	28/02/2013	100.0000	
		01/03/2013	31/03/2013	100.0000	
Monitoring equipment	Equipment	Type	Accuracy class	Calibration frequency	Calibration Information
	By-pass valve (HV-3402) Serial number not applicable	Butterfly valve	below 1% relative accuracy on %_on-line parameter	1/year	Last calibration
					07/02/2013
					Valid until
					06/02/2014
Measuring/ Reading/ Recording frequency:	Measured continuously and recorded daily/Aggregated monthly				
Calculation method (if applicable):	The %_on-line is recorded on a daily basis and is the ratio between the time of production of adipic acid while the unit is connected to the N2O destruction facility and the time of production. At the end of the month/period (y), %_on-line is calculated as: $\%_{\text{on-line}}_y = 1 - (Q_{\text{N}_2\text{O\_by-pass}}_y / (P_{\text{AdOH}}_y \times \text{N}_2\text{O\_} / \text{AdOH}_y))$ where N2O_/AdOH_y is the actual value of the month/period				
QA/QC procedures:	Data Handling Protocol ISAL-ADOH-QA-007				
Purpose of data:	(b) Calculation of project emissions or actual net GHG removals by sinks;				
Additional Comment:					

Data / Parameter:	Q_N2O_by-pass				
Data unit:	kg				
Description:	N2O by passing the decomposition facility				
Measured /Calculated /Default:	Calculated				
Source of data:	The data are automatically acquired continuously by DCS and stored in the PIMS.				
Value(s) of monitored parameter:		From	To	Q_N2O_bypass	N2O_/AdOH Calculated (Actual)
	Period Value:	01/01/2013	31/03/2013	37,248	0.298
	Monthly Values:	01/01/2013	31/01/2013	37,248	0.302
		01/02/2013	28/02/2013	0	0.299
		01/03/2013	31/03/2013	0	0.296
Monitoring equipment	Not applicable				

<b>Measuring/ Reading/ Recording frequency:</b>	Calculated and recorded daily/Aggregated monthly				
<b>Calculation method (if applicable):</b>	<p>The quantity of N<sub>2</sub>O that by-pass the facility is calculated following AM0021/version1:</p> <ul style="list-style-type: none"> <li>· <math>Q_{N_2O\_by-pass_d} = Q_{N_2O_d} \times (1 - \%_{on-line})</math> for each day (d)</li> <li><math>Q_{N_2O_d} = P_{AdOH_d} \times N_2O_{/AdOH}</math> where <math>N_2O_{/AdOH}</math> is the actual value (considering that it is higher than 0.27) following the final ruling regarding the request for issuance of CERs "N<sub>2</sub>O decomposition project of PetroChina Company Limited Liaoyang Petrochemical Company" (EB61).</li> <li>· <math>Q_{N_2O\_by-pass_d} = P_{AdOH_d} \times N_2O_{/AdOH} \times (1 - \%_{on-line})_d</math></li> </ul> <p>At the end of the month or period the quantity of N<sub>2</sub>O that by-passed the facility is summed for all days:</p> <ul style="list-style-type: none"> <li>· <math>Q_{N_2O\_by-pass_y} = \Sigma (Q_{N_2O\_by-pass_d})</math></li> </ul>				
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(b) Calculation of project emissions or actual net GHG removals by sinks;				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	<b>Q_Power</b>				
<b>Data unit:</b>	kWh				
<b>Description:</b>	Electric consumption of the decomposition facility				
<b>Measured /Calculated /Default:</b>	Measured				
<b>Source of data:</b>	The data are automatically acquired continuously by DCS and stored in the PIMS.				
<b>Value(s) of monitored parameter:</b>		From	To	Q_Power	
	Period Value:	01/01/2013	31/03/2013	90,714.8	
	Monthly Values:	01/01/2013	31/01/2013	28,665.1	
		01/02/2013	28/02/2013	29,848.4	
		01/03/2013	31/03/2013	32,201.3	
<b>Monitoring equipment</b>	<b>Equipment</b>	<b>Type</b>	<b>Accuracy class</b>	<b>Calibration frequency</b>	<b>Calibration Information</b>
	Electricity meter (JI-3461) Serial number 40115317	Electricity meter	+/- 0.20 %	2 years	Last calibration
					25/04/2012
					Valid until
					24/04/2014
<b>Measuring/ Reading/ Recording frequency:</b>	Measured continuously and recorded daily/Aggregated monthly				
<b>Calculation method (if applicable):</b>	The daily values are automatically generated in the DCS, the monthly values are obtained in the workbook by the sum of the daily values				
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(c) Calculation of leakage				
<b>Additional Comment:</b>					

<b>Data / Parameter:</b>	<b>E_Power</b>
<b>Data unit:</b>	kg CO <sub>2</sub> /kWh
<b>Description:</b>	CO <sub>2</sub> intensity for electric generation
<b>Measured /Calculated /Default:</b>	Calculated
<b>Source of data:</b>	Excel Workbook based on the data provided by Department of Utilities from Paulínia Site, considering the two sources of data obtained with: 1. ONS (Operador Nacional do Sistema Elétrico) <a href="http://www.ons.com.br/biblioteca_virtual/publicacoes_operacao_sin.aspx">http://www.ons.com.br/biblioteca_virtual/publicacoes_operacao_sin.aspx</a> 2. Brazilian Ministry of Mines and Energy (MME) <a href="http://www.mme.gov.br/mme/menu/todas_publicacoes.html">http://www.mme.gov.br/mme/menu/todas_publicacoes.html</a>
<b>Value (s) of monitored parameter:</b>	0.993
<b>Monitoring equipment</b>	Not applicable
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Calculated and recorded yearly
<b>Calculation method (if applicable):</b>	The E_Power was done using the latest available data from 2011. It is calculated according to the PDD monitoring plan based on ACM0002 version 2. E_Power is calculated by taking into account only the emission factors of the fossil-fuel electricity generation (simple OM). As explained in the PDD Monitoring Plan, ONS still does not supply the plant-specific data required for BM (build margin) calculation. This is a very conservative approach since only around 4% of the total electricity supplied to the grid is generated using fossil fuels in 2011 (around 96% of Hydro and Nuclear). The detailed calculation is available in the Excel file “Workbook ER Paulínia” of this period (in the worksheet “E_Power”) which is a confidential document communicated to the DOE and to the CDM Executive Board.
<b>QA/QC procedures applied:</b>	Data Handling Protocol ISAL-ADOH-QA-007
<b>Purpose of data:</b>	(c) Calculation of leakage
<b>Additional Comment:</b>	

<b>Data / Parameter:</b>	<b>CO<sub>2</sub>_Power</b>			
<b>Data unit:</b>	t CO <sub>2</sub>			
<b>Description:</b>	CO <sub>2</sub> Emissions from Electricity consumption			
<b>Measured /Calculated /Default:</b>	Calculated			
<b>Source of data:</b>	Excel workbook based on Q_Power and E_Power data			
<b>Value(s) of monitored parameter:</b>		From	To	CO <sub>2</sub> _Power
	Period Value:	01/01/2013	31/03/2013	91
	Monthly	01/01/2013	31/01/2013	29

	Values:	01/02/2013	28/02/2013	30				
		01/03/2013	31/03/2013	32				
<b>Monitoring equipment</b>	Not applicable							
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Calculated monthly							
<b>Calculation method (if applicable):</b>	Calculated monthly and expressed in tonnes, using Q_Power and E_Power CO2_Power= Q_Power x E_Power							
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007							
<b>Purpose of data:</b>	(c) Calculation of leakage							
<b>Additional Comment:</b>								
<b>Data / Parameter:</b>	<b>Q_Steam_c</b>							
<b>Data unit:</b>	kg							
<b>Description:</b>	Amount of steam consumed by the decomposition facility							
<b>Measured /Calculated /Default:</b>	Measured							
<b>Source of data:</b>	The data are automatically acquired continuously by DCS and stored in the PIMS.							
<b>Value(s) of monitored parameter:</b>		From	To	Q_Steam_c				
	Period Value:	01/01/2013	31/03/2013	107,000				
	Monthly Values:	01/01/2013	31/01/2013	38,900				
		01/02/2013	28/02/2013	35,600				
		01/03/2013	31/03/2013	32,500				
<b>Monitoring equipment</b>	<b>Equipment</b>	<b>Type</b>	<b>Accuracy class</b>	<b>Calibration frequency</b>	<b>Calibration Information</b>			
	6.5 bar steam flow meter (FQ-3409) Serial number 6270424	Orifice plate flow - Multivariable transmitter	+/- 1.25 %	1/year	Last calibration			
					19/12/2012			
					Valid until			
					18/12/2013			
<b>Measuring/ Reading/ Recording frequency:</b>	Measured continuously and recorded daily/Aggregated monthly							
<b>Calculation method (if applicable):</b>	Not applicable							
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007							
<b>Purpose of data:</b>	(c) Calculation of leakage							
<b>Additional Comment:</b>								
<b>Data / Parameter:</b>	<b>E_Steam_c</b>							
<b>Data unit:</b>	kg CO <sub>2</sub> /kg of steam							
<b>Description:</b>	CO <sub>2</sub> intensity for steam consumed in the facility							
<b>Measured /Calculated</b>	Calculated							

<b>/Default:</b>					
<b>Source of data:</b>	Excel workbook based on the E_Steam_c_NG, %GEN_NG, and E_Steam_c_chem&oil supplied by the Rhodia Paulínia Industrial Platform				
<b>Value(s) of monitored parameter:</b>	0.215				
<b>Monitoring equipment</b>	Not applicable				
<b>Measuring/ Reading/ Recording frequency:</b>	Measuring not applicable/Updated for each period				
<b>Calculation method (if applicable):</b>	<p>The steam consumed in the facility is supplied by existing boilers on site. E_Steam_c is calculated on a rolling year basis following the PDD in three steps. First we calculate E_Steam_c_NG, the CO<sub>2</sub> emission per kg of steam produced by the natural gas boilers. Second we calculate E_Steam_c_chem&amp;oil, which is the CO<sub>2</sub> emission per kg of steam produced by the boilers running on by-products and fuel oil. Finally E_Steam_c is calculated by weighting E_Steam_c_NG and E_Steam_c_chem&amp;oil with their real share in the total steam production</p> <p>The E_Steam_c is obtained by rounding up the following calculation:  <math display="block">E\_Steam\_c = E\_Steam\_c\_NG \times \%GEN\_NG + E\_Steam\_c\_chem\&amp;oil \times (1 - \%GEN\_NG)</math> </p>				
	Year ending	E_Steam_c_NG kg CO <sub>2</sub> / kg of steam	E_Steam_c_chem &oil kg CO <sub>2</sub> / kg of steam	%GEN_NG	E_Steam_c kg CO <sub>2</sub> / kg of steam
	01/01/2013	0.210	0.301	95.2	0.215
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007				
<b>Purpose of data:</b>	(c) Calculation of leakage				
<b>Additional Comment:</b>					
<b>Data / Parameter:</b>	CO <sub>2</sub> _Steam_c				
<b>Data unit:</b>	t CO <sub>2</sub>				
<b>Description:</b>	CO <sub>2</sub> Emissions from Steam consumption				
<b>Measured /Calculated /Default:</b>	Calculated				
<b>Source of data:</b>	Calculated from Q_Steam_c and E_Steam_c data				
<b>Value(s) of monitored parameter:</b>		From	To	CO <sub>2</sub> _Steam_c	
	Period Value:	01/01/2013	31/03/2013	24	
	Monthly Values:	01/01/2013	31/01/2013	9	
		01/02/2013	28/02/2013	8	
		01/03/2013	31/03/2013	7	
<b>Monitoring equipment</b>	Not applicable				

<b>Measuring/Reading/ Recording frequency:</b>	Measuring not applicable/Calculated monthly
<b>Calculation method (if applicable):</b>	Calculated monthly and expressed in tonnes, using Q_Steam_c and E_Steam_c CO2_Steam_c= Q_Steam_c x E_Steam_c
<b>QA/QC procedures:</b>	Data Handling Protocol ISAL-ADOH-QA-007
<b>Purpose of data:</b>	(c) Calculation of leakage
<b>Additional Comment:</b>	

<b>Data / Parameter:</b>	<b>NOx</b>				
<b>Data unit:</b>	<b>vppm</b>				
<b>Description:</b>	NO + NO <sub>2</sub> concentration in the stack gas Monitoring of the NOx content in the waste gas is required by local environmental legislation stated in the Commitment Agreement (TAC) signed with the Public Attorney of the State of São Paulo. NOx in the gaseous effluent can be randomly checked by the environmental agency Cetesb through sampling and analysis by an external laboratory. Analytical data show that the plant complies with the established environmental standard.				
<b>Measured /Calculated /Default:</b>	Measured				
<b>Source of data:</b>	The data are automatically acquired continuously by DCS and stored in the PIMS.				
<b>Value (s) of monitored parameter:</b>	<b>Parameter</b>	<b>Unit</b>	<b>Limit</b>	<b>Analytical results in this period</b>	
	NOx	vppm	300 max at least 95% of time	Average of 39 and less than 300 for 99.37% of time	
<b>Monitoring equipment</b>	<b>Equipment</b>	<b>Type</b>	<b>Accuracy Class</b>	<b>Calibration frequency</b>	<b>Calibration information</b>
	AI-3490A (NO) serial number 450561464363	3490A (Infrared)	+/- <1 %	1/week (Rhodia calibration)	Last calibration
					28/03/2013
					Valid until
					following week
				2/year (Third party preventive maintenance and calibration)	Last calibration
					14/03/2013
					Valid until
					13/09/2013
	AI-3490F (NO <sub>2</sub> ) serial number 450561464363	3490F (Ultraviolet)	+/- <1 %	1/week (Rhodia calibration)	Last calibration
					28/03/2013
					Valid until
					following week



				2/year (Third party preventive maintenance and calibration)	Last calibration
					28/03/2013
					Valid until
					13/09/2013
<b>Measuring/Recording frequency:</b>	Measured continuously and recorded daily/Aggregated monthly				
<b>Calculation method (if applicable):</b>	Not applicable				
<b>QA/QC procedures:</b>	Procedure UQP-3-ADO-QA-006				
<b>Purpose of data:</b>	Compliance with local regulation on NOx				
<b>Additional Comment:</b>					
D.3. Implementation of sampling plan					
Not applicable: AM0021 methodology version 1 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 amount of baseline emissions in the given period y is calculated using the following formula according to AM0021/version 1 equation (1):

$$BE_y = Q_{N_2O_y} \times GWP_{N_2O} + Q_{Steam\_py} \times E_{Steam_y}$$

It has been checked that there are no Brazilian regulation in place that would limit the quantity of N<sub>2</sub>O emitted that can be taken into account for the calculation of the baseline emissions (see D.2.1.4. in the PDD).

The quantity Q<sub>N<sub>2</sub>O<sub>y</sub></sub> of N<sub>2</sub>O emitted over the period can then be calculated by (AM0021/version1 – equation (2)):

$$Q_{N_2O_y} = P_{AdOH_y} \times N_2O_{/AdOH}$$

Over the period of reference the emission factor of the adipic acid plant was above the capped value of 0.27 kg N<sub>2</sub>O/kg AdOH (see: D.2). So the capped value is being used according to AM 0021/version 1. The baseline emissions in this monitoring period are calculated in the table below using the values detailed in section D.1 and D.2 above:

Parameter	Value	Unit
Q <sub>N<sub>2</sub>O<sub>y</sub></sub>	4,437,060	kg
P <sub>AdOH<sub>y</sub></sub> (eligible)	16,433.562	t
N <sub>2</sub> O <sub>/AdOH</sub>	0.270	kg N <sub>2</sub> O/kg AdOH
GWP <sub>N<sub>2</sub>O</sub> (1)	298	kgCO <sub>2</sub> e/kg N <sub>2</sub> O
Q <sub>Steam<sub>py</sub></sub>	19,462.300	t of Steam
E <sub>Steam<sub>y</sub></sub>	0.144	tCO <sub>2</sub> /t of Steam

(1) Kyoto Protocol Rule, Decision 2/CP.3 and IPCC

The Baseline Emissions over this monitoring period are calculated as:

$$\begin{aligned} BE_y &= P_{AdOH} \times N_2O_{/AdOH} \times GWP_{N_2O} + Q_{Steam\_py} \times E_{Steam_y} \\ &= 16,433.562 \times 0.270 \times 298 + 19,462,300 \times 0.144 \\ &= 1,322,244 + 2,803 \\ &= \mathbf{1,325,046 \text{ tCO}_2e} \end{aligned}$$

**BE<sub>y</sub> calculated in BE worksheet of the workbook is 1,325,043 tCO<sub>2</sub>e due to rounding down effects in the workbook calculations to be conservative in the final calculation of ER.**

(See Section D2 for details)

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

According to AM0021, version 1, the project emissions PE<sub>y</sub> are the emissions in the period y due to:

- the N<sub>2</sub>O that has not been sent to the decomposition process (i.e. the N<sub>2</sub>O that by-passed the decomposition facility)
- the N<sub>2</sub>O non-destroyed by the decomposition process
- the emissions due to the use of natural gas.

PE<sub>y</sub> is calculated as follows:

$$PE_y = (Q_{N_2O\_by-pass_y} + ND_{N_2O_y}) \times GWP_{N_2O} + Q_{NG_y} \times E_{NG_y} \text{ (AM0021/version 1 equation (5))}$$

With CO<sub>2</sub>\_NG<sub>y</sub> = Q<sub>NG<sub>y</sub></sub> × E<sub>NG<sub>y</sub></sub> (PDD section E.1) we get:

$$PE_y = (Q_{N_2O\_by-pass_y} + ND_{N_2O_y}) \times GWP_{N_2O} + CO_2\_NG_y, \text{ where:}$$

$$Q_{N_2O\_by-pass_y} = P_{AdOH_y} \times (1 - \%_{on-line_y}) \times N_2O_{/AdOH_y}$$

As a conservative interpretation of the methodology Q\_N2O\_by-passy is calculated using the actual value of N2O\_/AdOH<sub>y</sub>

$$ND\_N2O_y = Q\_GE_y \times N2O\_GE_y \times \text{Specific gravity of } N2O \times 10^{-6}$$

The project emissions in this monitoring period are calculated in the table below using the values presented in detail in section D:

Parameter	Value	Unit
P_AdOH <sub>y</sub>	16,433.562	t
N2O_/AdOH <sub>y</sub>	0.298	t N <sub>2</sub> O/t AdOH
%_on-line <sub>y</sub>	99.24	%
ND_ N2O <sub>y</sub>	1.050	t N <sub>2</sub> O
GWP_N2O (1)	298	tCO <sub>2</sub> e/tN <sub>2</sub> O
Q_NGy	1,605,544	Nm <sup>3</sup>
E_NGy	2.199E-03	tCO <sub>2</sub> e/Nm <sup>3</sup>

(1) Kyoto Protocol Rule, Decision 2/CP.3 and IPCC

The Project Emissions over this monitoring period are calculated as:

$$\begin{aligned}
 PE_y &= (P\_AdOH_y \times (1 - \%\_on-line_y) \times N2O\_/AdOH_y) + ND\_N2O_y \times GWP\_N2O + CO2\_NGy \\
 &= ((16,433.562 \times (1 - 0.99) \times 0.298) + 1.050) \times 298 + (1,605,544 \times 0.002199) \\
 &= 11413 + 3,530 \\
 &= \mathbf{14,944 \text{ tCO}_2\text{e}}
 \end{aligned}$$

**PE<sub>y</sub> calculated in PE worksheet of the workbook is 14,960 tCO<sub>2</sub>e due to rounding-up effects in the workbook calculations to be conservative in the final calculation of ER.**

### E.3. Calculation of leakage

Leakage emissions in a given period y comprise the emissions associated with the energy sources used to generate any steam and electricity used by the decomposition plant.

Leakage is calculated according to AM0021/version 1, equation (7):

The leakage emissions in this monitoring period are calculated in the table below using the values presented in the detail in section D:

Parameter	Value	Unit
Q_Powery <sub>y</sub>	90,714.8	kWh
E_Power	0.993	kg CO <sub>2</sub> /kWh
Q_Steam_c <sub>y</sub>	107,000	kg
E_Steam_c <sub>y</sub>	0.215	kg CO <sub>2</sub> /kg of steam

The Leakage Emissions over this monitoring period are calculated as:

$$\begin{aligned}
 Ly &= Q\_Powery \times E\_Power + Q\_Steam\_cy \times E\_Steam\_cy \\
 &= (90,714.8 \times 0.993) + (107,000 \times 0.215) \\
 &= 90,080 \text{ kg} + 23,005 \text{ kg} \\
 &= \mathbf{114 \text{ tCO}_2\text{e}}
 \end{aligned}$$

**Ly calculated in L worksheet of the workbook is 115 tCO<sub>2</sub>e due to rounding-up effects in the workbook calculations to be conservative in the final calculation of ER.**

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

Following the methodology AM0021/version 1 and the PDD section D.2.4, the total emission reductions achieved by this project activity during this monitoring period is:

$$ER_v = BE_v - PE_v - L_v$$

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO <sub>2</sub> e)
<b>Total</b>	<b>1,325,043</b>	<b>14,960</b>	<b>115</b>	<b>1,309,968</b>

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

In the PDD section E the emission reduction is estimated to be 5,961,165 tCO<sub>2</sub>e. So the PDD-estimated emission reduction relative to the monitoring period of 43 days is 702,271 tCO<sub>2</sub>e higher than the emission reductions of the current monitoring period.

Item	Values applied in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
<b>Emission reductions or GHG removals by sinks (tCO<sub>2</sub>e)</b>	<b>1,412,888</b>	<b>1,309,968</b>

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

The actual amount of Emission Reductions for this period is below the amount calculated using the PDD data.

<b>BE:</b>	PDD value = 1,690,021 tCO <sub>2</sub> e	Period = 1,325,043 tCO <sub>2</sub> e
Variance	Explanation	
- 364,111	The daily average production for this period was lower (around 182.60 t/d) than the estimate of the PDD.	
- 867	The steam produced in this period was lower than in PDD estimate.	
<b>- 364,978</b>	<b>Total BE variance</b>	

It is important to note that according to the methodology AM0021/version 1, the eligible adipic acid production that can be used in the baseline is yearly capped, so it limits on a yearly basis the emission reduction calculation claimed for CERs. Please refer to item E.1 for details.

<b>PE:</b>	PDD value = 276,831 tCO <sub>2</sub> e	Period = 14,960 tCO <sub>2</sub> e
Variance	Explanation	
241,890	The significant higher performance of the N <sub>2</sub> O abatement unit (the actual %_on-line of 99.239 % in this period is significantly higher than the value of 85% estimated in the PDD due to excellent operational performance).	
17,908	A higher destruction rate of the N <sub>2</sub> O which is around 99.98% during this period versus 99% taken conservatively in the PDD.	
2,073	Difference in the natural gas consumption estimate and actual in the period	
<b>261,871</b>	<b>Total PE variance</b>	

<b>L:</b>	PDD value = 302 tCO <sub>2</sub> e	Period = 115 tCO <sub>2</sub> e
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Variance	Explanation
187	Difference mainly due to the quantity of steam consumed
<b>187</b>	<b>Total L variance</b>

The actual emission reductions determined in this monitoring period are lower than the *pro rata* estimation based on the *ex-ante* calculation made in the PDD, as explained above.

**E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	0	1,309,968

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## Annex 1. Table of Equipments/General Information – Instrument Calibration &amp; Maintenance Status

Related PDD parameter	Instrument Location/Description	Tag Number	Parameter in PDD	Reference	Frequency	Work Done by	Previous calibration dates	Last calibration date	Remarks
P_AdOH	Packaging machine 25 kg	Z-3110	Dry AA (P_AdOH)	INMETRO - Brazil Standard Portaria no. 236 (22December1994)	1/month	Third party	22/11/2012 20/12/2012 17/01/2013 14/02/2013	14/03/2013	
P_AdOH	Packaging machine 25 kg	G-2532	Dry AA (P_AdOH)	INMETRO - Brazil Standard Portaria no. 236 (22December1994)	1/month	Third party	22/11/2012 20/12/2012 17/01/2013 14/02/2013	14/03/2013	
P_AdOH	Weigh scale 1000 kg	Z-3120	Dry AA (P_AdOH)	INMETRO - Brazil Standard Portaria no. 236 (22December1994)	4/year	Third party	06/06/2012 31/08/2012 22/11/2012	14/02/2013	
P_AdOH	Trucks weigh scale	BB-0090	N-salt production (P_AdOH)	INMETRO - Brazil Standard Portaria no. 236 (22December1994)	2/year	Third party	23/09/2012 15/10/2012	10/03/2013	
P_AdOH	Trucks weigh scale	BB-0335	N-salt production (P_AdOH)	INMETRO - Brazil Standard Portaria no. 236 (22December1994)	2/year	Third party	07/10/2012 15/10/2012	17/03/2013	
P_AdOH	Level of tank R-5300	LT-4500	N-salt production (P_AdOH)	Manufacturer Specifications	1/year	Rhodia	14/07/2011 11/07/2012	06/11/2012	
P_AdOH	Level of tank R-5310	LT-4509	N-salt production (P_AdOH)	Manufacturer Specifications	1/year	Rhodia	23/02/2012	18/02/2013	
P_AdOH	Refractometer	Lab equipment RFM-340	N-salt production (P_AdOH)	Manufacturer Specifications	1/week	Rhodia	20/12/2012 27/12/2012 03/01/2013 10/01/2013 17/01/2013 24/01/2013 31/01/2013 07/02/2013 14/02/2013 21/02/2013 28/02/2013 07/03/2013 14/03/2013 21/03/2013	28/03/2013	
				Manufacturer Specifications	2/year	Third party	14/08/2012	06/02/2013	
HNO3_cons	Nitric acid mass flowmeter	FQ-2179	Nitric Cons	Manufacturer Specifications	2 years	Third party	21/07/2010 30/05/2012	03/01/2013	Corrective maintenance was done during the Adipic Acid shutdown. Equipment was removed and calibrated on 03/01/2013. Independently of this event, the frequency will be kept considering the previous calibration on 30/05/2012.
HNO3_cons	Fresh nitric acid conc analyzer	AI-2179	Nitric Cons	Manufacturer Specifications	2 years	Third party	03/08/2010 30/05/2012	03/01/2013	Corrective maintenance was done during the Adipic Acid shutdown. Equipment was removed and calibrated on 03/01/2013. Independently of this event, the frequency will be kept considering the previous calibration on 30/05/2012.
HNO3_physical	Flowmeter of effluent to biological WWT	FQ-2973	Nitric Loss	Manufacturer Specifications	1/year	Rhodia	21/07/2011	11/07/2012	
HNO3_physical	Flowmeter of effluent to neutralization	FQ-2974	Nitric Loss	Manufacturer Specifications	1/year	Rhodia	21/07/2011	11/07/2012	
HNO3_physical	Waste gas flowmeter	FQ-3450	Nitric Loss	Manufacturer Specifications	1/year	Rhodia	30/11/2011	21/11/2012	
HNO3_physical	Nitric analyzer on effluent to neutralization	AI-2974	Nitric Loss	Manufacturer Specifications	2/month	Rhodia	13/12/2012 27/12/2012 10/01/2013 24/01/2013 07/02/2013 21/02/2013 07/03/2013	21/03/2013	

Annex 1. Table of Equipments/General Information – Instrument Calibration &amp; Maintenance Status

Related PDD parameter	Instrument Location/Description	Tag Number	Parameter in PDD	Reference	Frequency	Work Done by	Previous calibration dates	Last calibration date	Remarks
HNO <sub>3</sub> _physical	Nitric analyzer on effluent to neutralization	AI-2974B	For failure of AI-2974	Manufacturer Specifications	2/month	Rhodia	06/12/2012 20/12/2012 03/01/2013 17/01/2013 31/01/2013 14/02/2013 28/02/2013 14/03/2013 20/03/2013 (1)	28/03/2013	(1) Corrective maintenance was done on 20/03/2013. Independently of this event, the maintenance frequency will be kept considering the previous calibration on 14/03/2013.
HNO <sub>3</sub> _physical	NOx analyzer in the waste gas stream	AI-2195AB	Nitric Loss	Manufacturer Specifications	1/week	Rhodia	20/12/2012 27/12/2012 03/01/2013 10/01/2013 17/01/2013 24/01/2013 31/01/2013 07/02/2013 14/02/2013 21/02/2013 28/02/2013 07/03/2013 14/03/2013 21/03/2013	28/03/2013	Adopt the new procedure of preventive maintenance and calibration with the equipment's supplier.
					2/year	Third party		12/03/2013	
HNO <sub>3</sub> _cons	Level of nitric acid storage tank F-1769	LI -3350	Nitric Cons (backup)	Manufacturer Specifications	1/year	Rhodia	08/03/2012 19/04/2012	26/02/2013	
HNO <sub>3</sub> _cons	Flowmeter of fresh nitric acid to storage	FQ-3318	Nitric Cons (backup)	Manufacturer Specifications	1/year	Third party	29/02/2012 17/04/2012 08/10/2012	26/02/2013 (1)	(1) On 12/03/2013, due to corrective maintenance the flowmeter was replaced by other flowmeter calibrated on 26/02/2013. Independently of this event, the calibration frequency will be kept based on 08/10/2012.
Q_NG	Natural gas flowmeter	FQ-3408	Project emission	INMETRO - Brazil Standard Portaria no. 114 (16October1997)	2 years	Third party	19/03/2010	29/02/2012	
Q_Steam_p	40 bar steam flowmeter	FQ-3470	Baseline emission	Manufacturer Specifications	1/year	Rhodia	28/09/2011	11/09/2012	
Q_Steam_c	6,5 bar steam flowmeter	FQ-3409	Leakage	Manufacturer Specifications	1/year	Rhodia	03/01/2012	19/12/2012	
Q_GE	Stack effluent gas flowmeter	FQ-3490	Project emission	Manufacturer Specifications	1/year	Rhodia	29/06/2011 30/09/2011	12/09/2012	
N <sub>2</sub> O_GE	Stack N <sub>2</sub> O analyzer (in-situ, laser diode)	AI-3490B	Project emission	Manufacturer Specifications	2/year	Rhodia	04/10/2011	28/03/2012	Equipment is out of service since 25/08/2012. It was sent to supplier for repairing.
N <sub>2</sub> O_GE	Stack N <sub>2</sub> O analyzer (extractive, infrared)	AI-3490G	Project emission (backup)	Manufacturer Specifications	1/week	Rhodia	20/12/2012 27/12/2012 03/01/2013 10/01/2013 17/01/2013 24/01/2013 31/01/2013 07/02/2013 14/02/2013 21/02/2013 28/02/2013 07/03/2013 14/03/2013 21/03/2013	28/03/2013	Adopt the new procedure of preventive maintenance and calibration with the equipment's supplier.
					2/year	Third party		14/03/2013	

Annex 1. Table of Equipments/General Information – Instrument Calibration &amp; Maintenance Status

Related PDD parameter	Instrument Location/Description	Tag Number	Parameter in PDD	Reference	Frequency	Work Done by	Previous calibration dates	Last calibration date	Remarks
%_on-line	By-pass valve leak test	HV-3402	Project emission	PDD section D3	1/year	Third party	15/02/2012	07/02/2013	
Q_Power	Electricity meter	JI-3461	Leakage	ONS - Brazil Standard Submódulo 12.3 (07July2008)	2 years	Third party	27/07/2010 11/04/2012 24/04/2012	25/04/2012	
HNO <sub>3</sub> _physical	Waste gas flowmeter	FIC-3401	For failure of FQ-3450	Manufacturer Specifications	1/year	Rhodia	05/10/2011	26/09/2012	
Q_NG	Natural gas flowmeter	FQ-3460	For failure of FQ-3408	INMETRO - Brazil Standard Portaria no. 114 (16October1997)	2 years	Third party	03/03/2010	03/10/2011	
Q_Steam_p	Boiler feed water flowmeter	FQ-3410	For failure of FQ-3470	Manufacturer Specifications	1/year	Rhodia	27/09/2011	10/09/2012	
P_AdOH	Level of tank RE-2422	LI-2422	Inventory variation	Manufacturer Specifications	1/year	Third party	17/08/2012 05/12/2012 (1) 17/08/2012 (2)	05/12/2012 (3)	(1) The level measurement device was substituted on 02/01/2013 by equipment calibrated on 05/12/2012. Therefore, 05/12/2012 was considered the calibration date. (2) Due to corrective maintenance the device was replaced by other device on 19/02/2013 calibrated on 17/08/2012. Therefore 17/08/2012 was considered the calibration date. (3) On 25/03/2013 was returned the previous device which kept the previous calibration done on 05/12/2012. Therefore, 05/12/2012 was considered the calibration date.
	Stack NO analyzer (extractive, infrared)	AI-3490A	NOx emission control	Manufacturer Specifications	1/week	Rhodia	20/12/2012 27/12/2012 03/01/2013 10/01/2013 17/01/2013 24/01/2013 31/01/2013 07/02/2013 14/02/2013 21/02/2013 28/02/2013 07/03/2013 14/03/2013 21/03/2013	28/03/2013	
					2/year	Third party		14/03/2013	
	Stack NO <sub>2</sub> analyzer (extractive, ultraviolet)	AI-3490F		Manufacturer Specifications	1/week	Rhodia	20/12/2012 27/12/2012 03/01/2013 10/01/2013 17/01/2013 24/01/2013 31/01/2013 07/02/2013 14/02/2013 21/02/2013 28/02/2013 07/03/2013 14/03/2013 21/03/2013	28/03/2013	
					2/year	Third party		14/03/2013	
* Source of data: Quality Management System and SAP and Excel file "Instrument List"									
INMETRO - Instituto Nacional de Metrologia <a href="http://www.inmetro.gov.br">www.inmetro.gov.br</a> ONS - Operador Nacional do Sistema Elétrico <a href="http://www.ons.org.br">www.ons.org.br</a>									



## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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 anthropogenic 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.
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