Monitoring report form

(Version 04.0)

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	Omnia N_2O Abatement Project II
Reference number of the project activity	6083
Version number of the monitoring report	01
Completion date of the monitoring report	07 June 2014
Registration date of the project activity	30 April 2012
Monitoring period number and duration of this monitoring period	Monitoring Period 2 1/12/2012 – 31/05/2014 Duration (547days)
Project participant(s)	Omnia Fertilizer, Division of Omnia Group (Pty) Ltd., South Africa ("Omnia")
Host Party(ies)	Republic of South Africa
Sectoral scope and selected methodology(ies), and where applicable, applied standardized baseline(s)	Sectoral Scope: 05 Applied Methodology: ACM0019 v01.0.0.
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	635 136 tCO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	437 887 tCO2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	15 205 tCO2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	422 682 tCO2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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a) The increasing demand for fertilizer in South Africa induces the development of new and additional facilities related to fertilizer manufacturing. Omnia Fertilizer, a division of Omnia Group (Pty) Ltd. (hereafter "Omnia") is a leading Nitrogen Fertilizer producer in South Africa. Omnia operates nitric acid plants in Sasolburg, South Africa including N_2O Abatement registered as CDM Project 0752 for the first plant. A new second nitric acid plant was commissioned second quarter 2012, designed by Uhde GmbH with a confirmed production capacity of 400,000 ton 100% concentrated nitric acid per year.

Nitrous Oxide (N_2O) is an undesired by-product of the nitric acid (HNO_3) production process at the synthetic fertilizer production facility. However, N_2O emissions from nitric acid production are not regulated in South Africa. No N_2O abatement system was designed into the plant. Without the incentive of the proposed CDM project activity, approx. 800,000 tCO_2e per year[1] would be emitted at Omnia Nitric Acid Plant II. Therefore the baseline scenario without the CDM project would be the operation of the nitric acid plant without N_2O reduction catalyst.

The aim of the project activity is to reduce N_2O emissions in the tail gas by installing a tertiary catalyst after the absorption unit. It is expected that the N_2O abatement catalyst reduces 98 % of the N_2O[2]. Against the standardized baseline emissions factor the project would generate an estimated 3,481,376 t CO_2e emission reductions during a 10 year crediting period.

b) The N_2O abatement system consists of a tertiary N_2O catalyst unit, which is installed downstream of the HNO_3 absorber and before the tail gas turbine. It was designed and constructed by Uhde and is called the EnviNox^{TM} system. The tertiary catalyst consists of an additional catalysts containment facility that was erected at the plant.

c) Relevant Dates for the Project Activity

Date	Event
14 September 2009	Basic Engineering Nitric Acid Plant
09 March 2010	Detailed engineering Design Nitric Acid Plant
04 June 2011	Approval of ACM0019 by UNFCCC
18 July 2011	Change Order UHDE from De-NOx to EnviNox TM
31 March 2012	Commission Nitric Acid Plant
31 March 2012	Commission Project
30 April 2012	Project registered at UNFCCC
30 April 2012	Start Crediting period

d) The total emission reductions achieved in this monitoring period **437 887** tCO_2e.

A.2. Location of project activity

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a) Host Party: Republic of South Africa

b) Free State Province, Sasolburg, Metsimaholo Municipality

c) Omnia's plant is located at latitude of approximately 26°48'48" South and a longitude of 27°51'23" East.

[1] An estimated business-as-usual emissions factor of 6.45kgN_2O/tHNO_3 (Average Baseline Emission factor of the first 5 monitoring periods of the first N_2O abatement project at Omnia's existing nitric acid plant) and annual confirmed capacity of 400,000tHNO_3/year was taken into account.

[2] While the calculations are based on this conservative assumption it should be noted that from experience from Omnia´s first N_2O reduction project as well as from other similar projects with the same technology even higher abatement efficiencies of up to 99.9 % were observed.

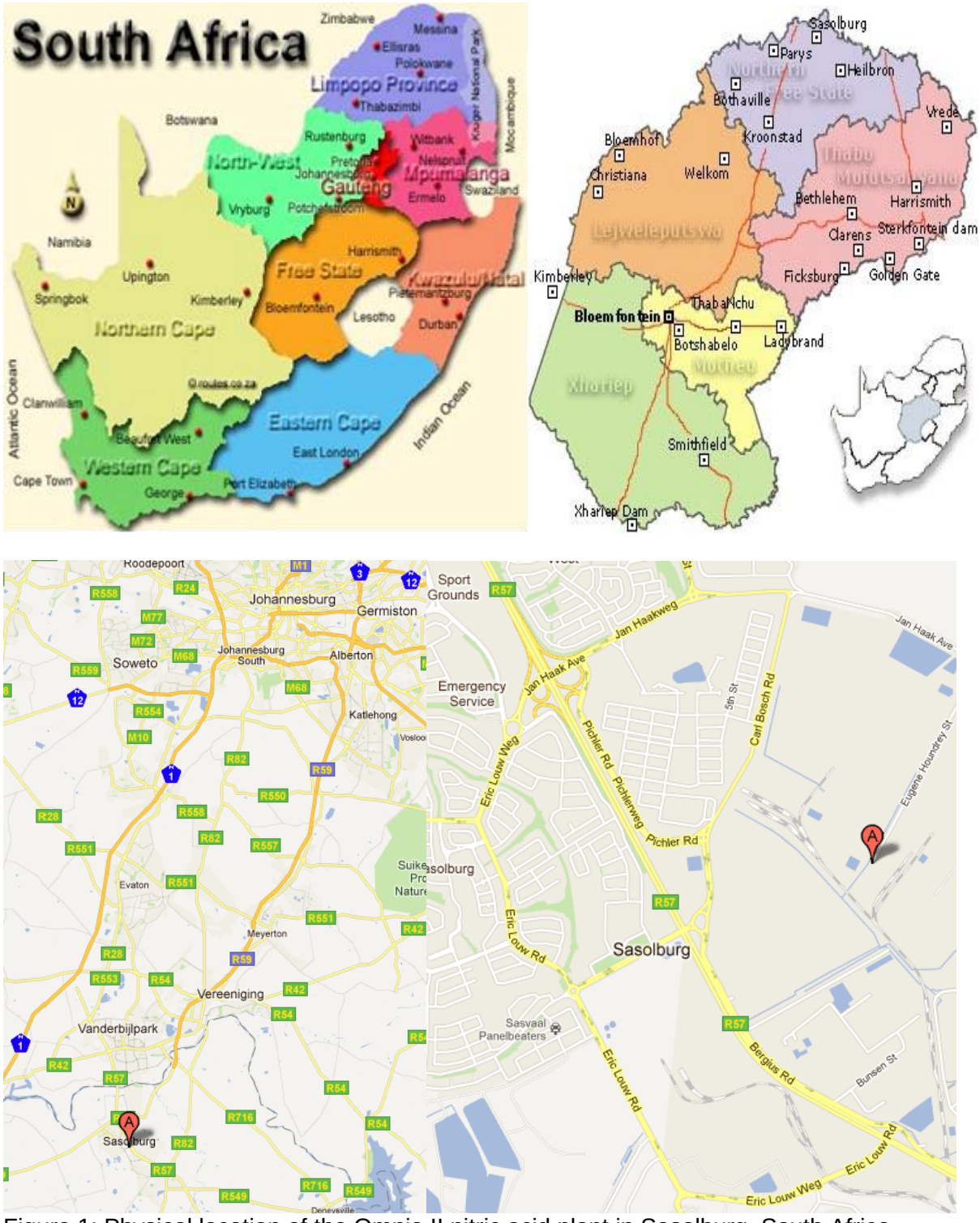

Figure 1: Physical location of the Omnia II nitric acid plant in Sasolburg, South Africa

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)

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)
Party A (host)	Private entity A: Public entity A: Omnia Fertilizer, Division of Omnia Group (Pty) Ltd., (Owner and operator of the nitric acid plant	No
Party B	Private entity B Public entity B	
…	…	

A.4. Reference of applied methodology and standardized baseline

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1. (a) Applied methodology: ACM0019 Version 01.0.0: "N_2O abatement from nitric acid production"
   (b) Applied tools:

i. "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (Version 02)
ii. "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)

2. N/A

A.5. Crediting period of project activity

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(a) Type of Crediting Period: Non-renewable 10 years and 0 months
(b) Start date of Crediting Period: 30/04/2012
(c) Start of this Monitoring Period: 1/12/2012
(d) End date of this Monitoring Period: 31/05/2014
(e) Length of this Monitoring Period: 547days

A.6. Contact information of responsible persons/ entities

>>

Eden Jack
Senior Technical Manager
Monitoring Report
Emission Reduction Calculation
Technical Manager
Focal Point UNFCCC and DOE

Pieter Van Der Merwe
Plant Operation
General Manager Nitrates
Measurement

Michael Tamakloe
General Manager Services
Equipment Calibration
Equipment Maintenance

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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a) The project activity entails the installation of:

- Tertiary N_2O abatement technology,
- Specialized monitoring equipment that is installed at the tail gas stream after the abatement of N_2O emissions (see Monitoring Plan in this PDD for further information).

Catalyst Technology

In the production process of nitric acid (HNO_3), NO_2 is produced as an intermediate material from ammonia (NH_3). The associated chemical reactions of oxidizing ammonia and simultaneous unwanted reactions are as follows:

1.	$NH_3 + 2\ O_2$	$\rightarrow$	$HNO_3 + H_2O$	(overall desirable reaction)
2.	$4\ NH_3 + 5\ O_2$	$\rightarrow$	$4\ NO + 6\ H_2O$	(desirable in the NH_3 oxidization process)
3.	$2NO + O_2$	$\rightarrow$	$2\ NO_2$	(desirable in the NO oxidization process)
4.	$3\ NO_2 + H_2O$	$\rightarrow$	$2\ HNO_3 + NO$	(desirable in the NO_2 absorption process)
5.	$4\ NH_3 + 3\ O_2$	$\rightarrow$	$2\ N_2 + 6\ H_2O$	(undesirable)
6.	$4\ NH_3 + 4\ O_2$	$\rightarrow$	$2\ N_2O + 6\ H_2O$	(undesirable)
7.	$2\ NH_3 + 8\ NO$	$\rightarrow$	$5\ N_2O + 3\ H_2O$	(undesirable)

Through the sixth and seventh reactions, some N_2O is generated in the process.

The N_2O abatement technology will be installed in the tail gas downstream after the HNO_3 absorber and before the tail gas turbine. A tertiary catalyst reduces N_2O that is formed in the primary ammonia oxidation reaction. A wide range of metals (e.g. Cu, Fe, Mn, Co and Ni) have been shown to be of varied efficiency in N_2O abatement catalysts. The abatement efficiency of this pelleted catalyst has been shown to be up to 99.9% in the following reaction[3]:

$$4N_2O + CH_4 \rightarrow 4\ N_2 + 2H_2O + CO_2$$

In the tertiary abatement system N_2O is removed by catalytic reduction with a hydrocarbon, such as methane from natural gas.

The applied technology is chosen because it has negligible risk of decreasing HNO_3 production and a high expected N_2O reduction.

The expected lifetime of the N_2O reduction unit is at least 10 years. It is expected to be in the range of 25 years. However the installed catalyst itself may need to be replaced after a few years, depending on the achieved abatement performance.

In addition NO_x is reduced in a separate catalyst bed by reduction with ammonia.

[3] While the calculations of estimated emission reductions are based on the conservative estimation of an abatement efficiency of 98 %, it should be noted that from experience from Omnia´s first N_2O reduction project as well as from other similar projects with the same technology even higher abatement efficiencies of up to 99.9 % were observed.

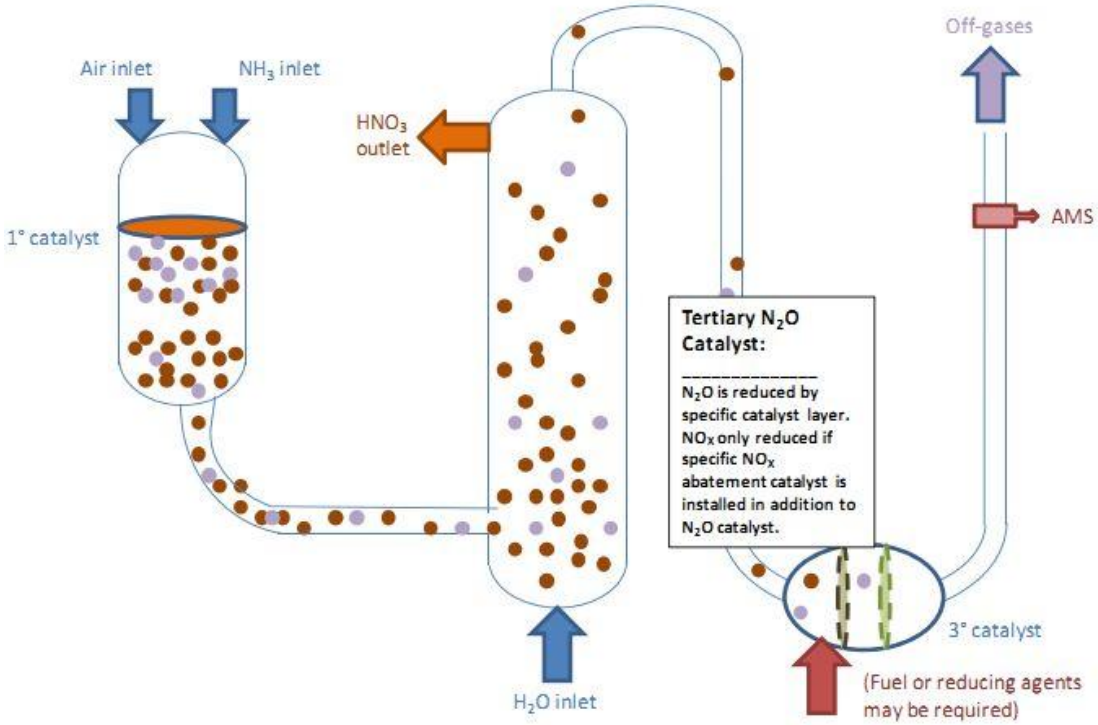

Figure 2: Image flow of tertiary catalyst unit

Events or situations during this monitoring period

b)

Start date	End date	Duration, hrs	Reason/Explanation
2012/09/23 00:00:00	2012/09/28 00:00:00	117	Planned plant shut and gauze change
2012/10/01 00:00:00	2012/10/02 00:00:00	14	NA Plant trip. High LP steam temperature
2012/10/11 00:00:00	2012/10/11 00:00:00	10	NA Plant trip. NH3 valve closed off
2012/10/12 00:00:00	2012/10/12 00:00:00	12	NA plant trip. Triveni faulty vibration probes
2012/10/14 00:00:00	2012/10/14 00:00:00	16	Low production
2012/11/26 00:00:00	2012/11/28 00:00:00	32	NA plant trip- faulty instrumentation card
2012/12/20 00:00:00	2012/12/21 00:00:00	31	NA plant trip. Low Eskom voltage supply
2012/12/26 00:00:00	2012/12/29 00:00:00	81	NA plant stopped. Low pH in boiler feed water
2012/12/30 00:00:00	2012/12/31 00:00:00	38	NA plant trip - faulty steam drum level transmitter
2013/01/01 00:00:00	2013/01/04 00:00:00	72	NA plant trip - Eskom power failure
2013/01/05 00:00:00	2013/01/06 00:00:00	34	NA plant trip - faulty Eskom cable
2013/01/07 00:00:00	2013/01/07 00:00:00	13	NA plant trip - low steam drum level
2013/01/08 00:00:00	2013/01/24 00:00:00	406	NA plant trip - Economizer leak repair
2013/02/15 00:00:00	2013/02/16 00:00:00	15	NA plant trip - Eskom power failure
2013/02/25 00:00:00	2013/02/25 00:00:00	2	NA plant stopped. Low pH
2013/02/26 00:00:00	2013/03/01 00:00:00	60	NA plant stopped. Economizer leak
2013/03/02 00:00:00	2013/03/02 00:00:00	19	NA plant start up
2013/03/10 00:00:00	2013/03/10 00:00:00	6	NA plant stop
2013/03/11 00:00:00	2013/03/19 00:00:00	216	Annual plant shut and gauze change
2013/03/20 00:00:00	2013/03/20 00:00:00	8	NA plant trip - low instrument air pressure
2013/03/23 00:00:00	2013/03/28 00:00:00	75	NA plant trip - Eskom power failure
2013/05/09 00:00:00	2013/05/09 00:00:00	17	NA plant trip - Eskom power failure
2013/05/10 00:00:00	2013/05/10 00:00:00	4	NA plant trip - Eskom power failure
2013/05/29 00:00:00	2013/05/31 00:00:00	44	NA plant trip - low instrument air pressure
2013/07/10 00:00:00	2013/07/10 00:00:00	0	Low production
2013/08/11 00:00:00	2013/08/11 00:00:00	3	Planned plant shut
2013/08/12 00:00:00	2013/08/16 00:00:00	120	Planned plant shut, maintenance and gauze change
2013/08/17 00:00:00	2013/08/17 00:00:00	17	Plant start up
2013/10/20 00:00:00	2013/10/22 00:00:00	35	NA plant trip- low NH3 pressure
2013/10/26 00:00:00	2013/10/29 00:00:00	82	NA plant stopped - Economizer tube failure
2013/11/10 00:00:00	2013/11/11 00:00:00	25	NA plant stopped - low efficiencies
2013/11/21 00:00:00	2013/11/21 00:00:00	16	NA plant trip - gauze temperature high
2014/01/11 00:00:00	2014/01/12 00:00:00	25	Plant trip - low steam pressure
2014/01/19 00:00:00	2014/01/21 00:00:00	32	Plant trip - power outage
2014/02/02 00:00:00	2014/02/08 00:00:00	133	Plant shut and gauze change
2014/02/13 00:00:00	2014/02/13 00:00:00	10	Plant trip- loose instrument connections
2014/05/16 00:00:00	2014/05/19 00:00:00	96	Planned stop - Eskom power shut
Total down time		**1936**	

c) Description of:

i. Events or situations that may have impacted the applicability of the applied methodology:

None

ii. The following describes how these events or situations have been addressed:

N/A

B.2. Post registration changes

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

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Have there been any temporary deviations from the monitoring plan during this monitoring period?

No

B.2.2. Corrections

>>
Have there been any corrections to the project information or parameters fixed at validation approved during this monitoring period or submitted in this monitoring report?
No

B.2.3. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>>
No

B.2.4. Changes to project design of registered project activity

>>
No

B.2.5. Changes to start date of crediting period

>>
No

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

>>
Not Applicable

SECTION C. Description of monitoring system

>>

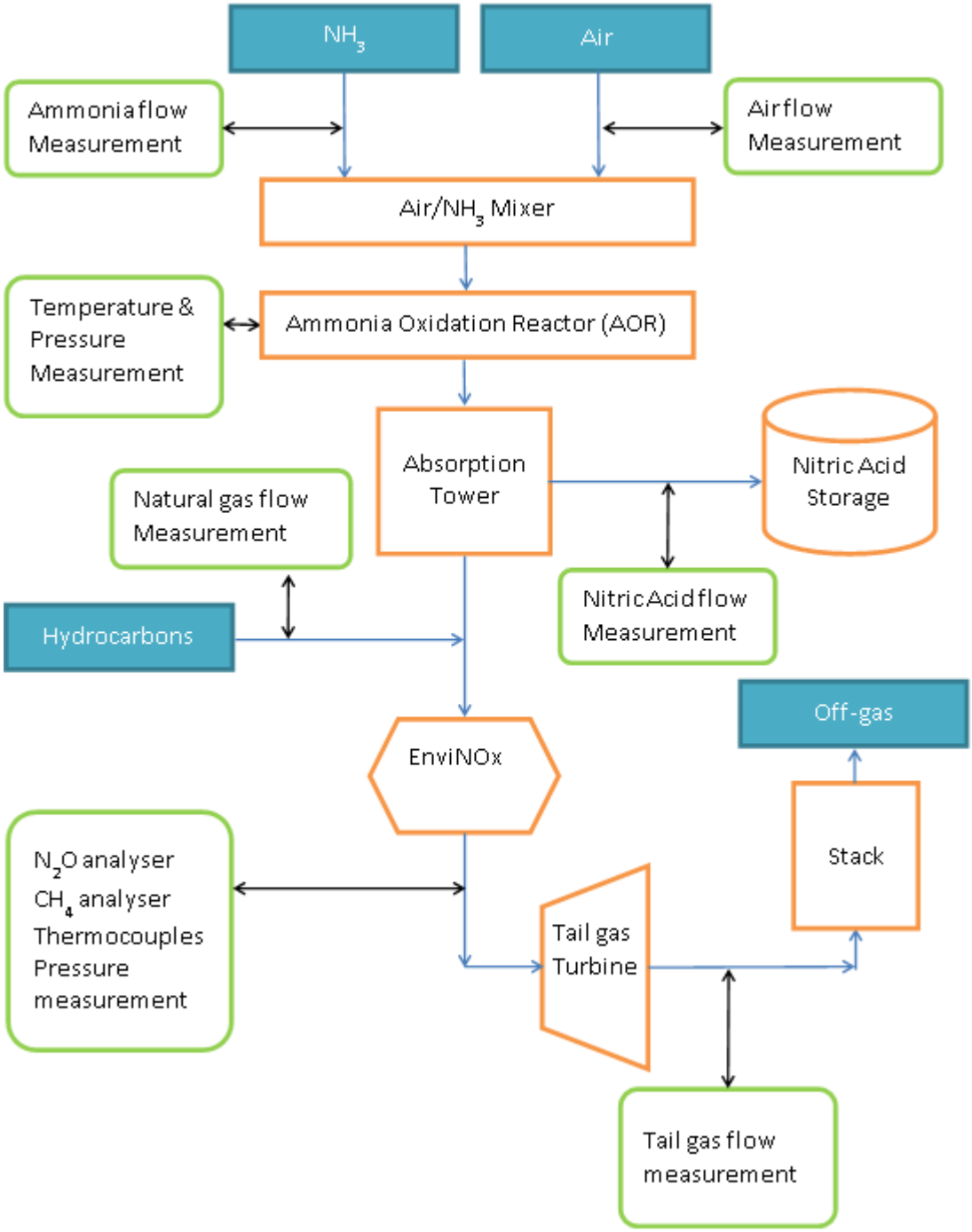

Figure 3: Schematic diagram of location of sample points

Sample points

The sample points were chosen in accordance with the AMS requirements, EN 14181 requirements and the plant design specifications to allow an optimum of data collecting quality.

The location of the sample point was selected to provide ease of access and a location close to the analyser. The most suitable position is in the horizontal section of the exit stack. At this point, the gas is still hot (above dew point) and well mixed. The graph above shows the location of the sample point schematically.

Analyser

The Emerson D-EMS 2000 is capable of analysing N_2O concentration in gas mixtures. The continuous NDIR industrial photometer can selectively measure concentrations of up to four sample components. In this case it is equipped for the measurement of N_2O and NO. The analyser

features gas-filled opto-pneumatic detectors. The detector provides optimum sensitivity and high selectivity compared with the other gas components in the sample. Gas-filled calibration cells are used for automatic calibration. The Analyser is QAL1 tested for the measurement of N_2O.

Sample Conditioning System

The gas sample is extracted at the sampling point particles are removed with a heated filter unit and the clean sampling gas is delivered through a heated sampling line to the analyser cabinet. Before being fed to the analyser, moisture is removed by a sample conditioning system that is installed in the analyser cabinet. The minimum flow rate to the analyser is controlled and connected to an alarm.

Stack gas flow meter

The Durag annubar measuring system operates according to the differential pressure principle. The probe has two separate chambers, between which the flow builds up a differential pressure. Taking into account the other flow parameters such as, e.g. absolute pressure and temperature, the volume flow is converted from operating to standard conditions with the help of the D-FL 100-10 microprocessor evaluation unit.

The D-FL 100 is type tested to the guidelines of the German Federal Ministry for the Environment, Nature Conservation and Reactor Safety on suitability testing of measuring equipment for continuous measuring of emissions and is therefore officially QAL1 approved (see below).

Accuracy and Calibration of Instruments

All meters are maintained to ensure a high level of accuracy. The exact specifications of each meter have been included in procedures to maintain those levels of accuracy. These procedures can be found for each parameter in section D.2.

ACM0019 requires all key meters to be subject to a quality control regime that will include regular maintenance and calibration according to the European Norm EN 14181. A record is being maintained showing the location and unique identification number of each meter, the calibration status of that meter (when last calibrated, when next due for calibration).

In the following, it is described how the procedures given in EN 14181 for QAL1-3 have been applied at the plant.

NEW NAAN ENVINOXS 2 SEPT 2012					
Equipment Name	**Serial Number**	**Description**	**Calibration frequency**	**Previous Calibration date Installation Start up April**	**Last Calibration Date**
TI-95006	SN:02340218	AMMONIA TEMP TO ENVINOX	+/- Every 6 months or a Gause change		**26/09/2012**
TI-95070	SN:02389946	Talgas to reactor		11/07/2011	**26/09/2012**
TI-95071	SN:02389947 /03308054	NATURAL GAS TEMP	+/- Every 6 months or a Gause change	11/07/2011	**26/09/2012**
TI-95020	SN:02340228	TAILGAS OUTLET FROM ENVINOX TEMP			
TI-95072	SN:02389948 /49490828	TAILGAS OUTLET FROM ENVINOX TEMP	+/- Every 6 months or a Gause change	11/07/2011	**26/09/2012**
FIC-95001 Transmitter	SN:3807542	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change		**25/09/2012**
FIC-95001 Sensor	SN:14206002	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change		**25/09/2012**
FIC-95060 Transmitter	SN:3816752	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	07/12/2011	**25/09/2012**
FIC-95060 Sensor	SN:14257727	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	07/12/2011	**25/09/2012**
FI-95013	SN:9084943	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	08/12/2011	**26/09/2012**
FI-95013_PT_C	SN:	TAILGAS OUTLET FLOW			
FI-95014	SN:9084944	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	08/12/2011	**26/09/2012**
FI-95014_PT_C	SN:	TAILGAS OUTLET FLOW			
FI-95015	SN:1223797	TAILGAS OUTLET FLOW	Part of Durag	Part of Durag	**26/09/2012**
FI-95015_PT_C	SN:	TAILGAS OUTLET FLOW			
PT-95015	SN:8953776	TAILGAS OUTLET FLOW			**26/09/2012**
PI-95027	SN:8953784	AMMONIA PRESSURE	+/- Every 6 months or a Gause change		**26/09/2012**
PI-95040	SN:9084940	NATURAL GAS PRESSURE		08/12/2011	**26/09/2012**
PI-95041	SN:9084941	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	08/12/2011	**26/09/2012**
PI-95042	SN:9084942	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	08/12/2011	**26/09/2012**
PI-95003_A	SN:8953762	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		
PI-95003_B	SN:8953763	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		
PI-95003_C	SN:8953765	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		
FI-95003_A	SN:8953743	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		
FI-95003_B	SN:8953744	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		
FI-95003_C	SN:9051234	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		
TI-95003_A	SN:02340214	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		
TI-95003_B	SN:02340215	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		
TI-95003_C	SN:02377804	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		
DY-95023	SN:3807799 TRANSMITTER	HNO CONSENTRATE	+/- Every 6 months or a Gause change	06/12/2010	**25/09/2012**
DI-95023	SN:14206070 SENSOR	HNO CONSENTRATE	+/- Every 6 months or a Gause change	06/12/2010	**25/09/2012**
TI-95012_A	SN:02409991	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_B	SN:02409992	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_C	SN:02409993	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_A	SN:02409994	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_B	SN:02409995	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_C	SN:02409996	GAUZE TEMP	+/- Every 6 months or a Gause change		
AI-95004	SN:3710103054099	INLET ANALYSER MLT	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	21/12/2011	**14/09/2012**
			AST Annually		
			QAL 2 every 3 years		23/06/2012
AI-95005	SN:9910103055428	OUTLET ANALYSER CLD	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	21/12/2011	**14/09/2012**
			AST Annually		
			QAL 2 every 3 years		**23/06/2012**
Durag D-FL 100		Volume Flow Meusure System		17/11/2010	**14/09/2012**

NEW NAAN ENVINOXS 2 MRT 2013					
Equipment Name	**Serial Number**	**Description**	**Calibration frequency**	**Previous Calibration date**	**Last Calibration Date**
TI-95006	SN:02340218	AMMONIA TEMP TO ENVINOX	+/- Every 6 months or a Gause change	26/09/2012	
TI-95070	SN:02389946	Talgas to reactor		26/09/2012	03/04/2013
TI-95071	SN:02389947/03308 054	NATURAL GAS TEMP	+/- Every 6 months or a Gause change	26/09/2012	03/04/2013
TI-95020	SN:02340228	TAILGAS OUTLET FROM ENVINOX TEMP			
TI-95072	SN:02389948/49490 828	TAILGAS OUTLET FROM ENVINOX TEMP	+/- Every 6 months or a Gause change	26/09/2012	03/04/2013
FIC-95001 Transmitter	SN:3807542	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change	25/09/2012	03/04/2013
FIC-95001 Sensor	SN:14206002	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change	25/09/2012	03/04/2013
FIC-95060 Transmitter	SN:3816752	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	25/09/2012	03/04/2013
FIC-95060 Sensor	SN:14257727	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	25/09/2012	03/04/2013
FI-95013	SN:9084943	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	26/09/2012	03/04/2013
FI-95013_PT_C	SN:	TAILGAS OUTLET FLOW			0
FI-95014	SN:9084944	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	26/09/2012	03/04/2013
FI-95014_PT_C	SN:	TAILGAS OUTLET FLOW			0
FI-95015	SN:1223797	TAILGAS OUTLET FLOW	Part of Durag	26/09/2012	03/04/2013
FI-95015_PT_C	SN:	TAILGAS OUTLET FLOW			0
PT-95015	SN:8953776	TAILGAS OUTLET FLOW		26/09/2012	03/04/2013
PI-95027	SN:8953784	AMMONIA PRESSURE	+/- Every 6 months or a Gause change	26/09/2012	03/04/2013
PI-95040	SN:9084940	NATURAL GAS PRESSURE		26/09/2012	03/04/2013
PI-95041	SN:9084941	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	26/09/2012	03/04/2013
PI-95042	SN:9084942	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	26/09/2012	03/04/2013
PI-95003_A	SN:8953762	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		0
PI-95003_B	SN:8953763	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		0
PI-95003_C	SN:8953765	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		0
FI-95003_A	SN:8953743	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		0
FI-95003_B	SN:8953744	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		0
FI-95003_C	SN:9051234	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		0
TI-95003_A	SN:02340214	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		0
TI-95003_B	SN:02340215	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		0
TI-95003_C	SN:02377804	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		0
DY-95023	SN:3811087 TRANSMITTER	HNO CONSENTRATE	+/- Every 6 months or a Gause change	25/09/2012	03/04/2013
DI-95023	SN:14206070 SENSOR	HNO CONSENTRATE	+/- Every 6 months or a Gause change	25/09/2012	03/04/2013
TI-95012_A	SN:02409991	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_B	SN:02409992	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_C	SN:02409993	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_A	SN:02409994	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_B	SN:02409995	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_C	SN:02409996	GAUZE TEMP	+/- Every 6 months or a Gause change		
AI-95004	SN:3710103054099	INLET ANALYSER MLT	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	20/02/2013	21/08/2013
			AST Annually		24/06/2013
			QAL 2 every 3 years	23/06/2012	
AI-95005	SN:9910103055428	OUTLET ANALYSER CLD	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	20/02/2013	21/08/2013
			AST Annually		24/06/2013
			QAL 2 every 3 years	23/06/2012	
Durag D-FL 100		Volume Flow Meusure System		14/09/2012	24/06/2013

NEW NAAN ENVINOXS 2 AUGST 2013					
Equipment Name	**Serial Number**	**Description**	**Calibration frequency**	**Previous Calibration date**	**Last Calibration Date**
TI-95006	SN:02340218	AMMONIA TEMP TO ENVINOX	+/- Every 6 months or a Gause change		14/08/2013
TI-95070	SN:02389946	Talgas to reactor		03/04/2013	
TI-95071	SN:02389947 /03308054	NATURAL GAS TEMP	+/- Every 6 months or a Gause change	03/04/2013	14/08/2013
TI-95020	SN:02340228	TAILGAS OUTLET FROM ENVINOX TEMP			
TI-95072	SN:02389948 /49490828	TAILGAS OUTLET FROM ENVINOX TEMP	+/- Every 6 months or a Gause change	03/04/2013	14/08/2013
FIC-95001 Transmitter	SN:3807542	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change	03/04/2013	15/08/2013
FIC-95001 Sensor	SN:14206002	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change	03/04/2013	15/08/2013
FIC-95060 Transmitter	SN:3816752	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	03/04/2013	15/08/2013
FIC-95060 Sensor	SN:14257727	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	03/04/2013	15/08/2013
FI-95013	SN:9084943	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	03/04/2013	14/08/2013
FI-95013_PT_C	SN:	TAILGAS OUTLET FLOW			
FI-95014	SN:9084944	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	03/04/2013	14/08/2013
FI-95014_PT_C	SN:	TAILGAS OUTLET FLOW			
FI-95015	SN:1223797	TAILGAS OUTLET FLOW	Part of Durag	03/04/2013	Must not be remove
FI-95015_PT_C	SN:	TAILGAS OUTLET FLOW			
PT-95015	SN:8953776	TAILGAS OUTLET FLOW		03/04/2013	
PI-95027	SN:8953784	AMMONIA PRESSURE	+/- Every 6 months or a Gause change	03/04/2013	14/08/2013
PI-95040	SN:9084940	NATURAL GAS PRESSURE		03/04/2013	
PI-95041	SN:9084941	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	03/04/2013	14/08/2013
PI-95042	SN:9084942	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	03/04/2013	14/08/2013
PI-95003_A	SN:8953762	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		
PI-95003_B	SN:8953763	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		
PI-95003_C	SN:8953765	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		
FI-95003_A	SN:8953743	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		
FI-95003_B	SN:8953744	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		
FI-95003_C	SN:9051234	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		
TI-95003_A	SN:02340214	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		
TI-95003_B	SN:02340215	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		
TI-95003_C	SN:02377804	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		
DY-95023	SN:3811087 TRANSMITTER	HNO CONSENTRATE	+/- Every 6 months or a Gause change	03/04/2013	15/08/2013
DI-95023	SN:14206070 SENSOR	HNO CONSENTRATE	+/- Every 6 months or a Gause change	03/04/2013	15/08/2013
TI-95012_A	SN:02409991	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_B	SN:02409992	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_C	SN:02409993	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_A	SN:02409994	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_B	SN:02409995	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_C	SN:02409996	GAUZE TEMP	+/- Every 6 months or a Gause change		
AI-95004	SN:3710103054099	INLET ANALYSER MLT	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	21/08/2013	21/08/2013
			AST Annually	24/06/2013	24/06/2013
			QAL 2 every 3 years		
AI-95005	SN:9910103055428	OUTLET ANALYSER CLD	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	21/08/2013	21/08/2013
			AST Annually	24/06/2013	24/06/2013
			QAL 2 every 3 years		
Durag D-FL 100		Volume Flow Meusure System		24/06/2013	24/06/2013

NEW NAAN ENVINOXS 4 Febr 2014					
Equipment Name	**Serial Number**	**Description**	**Calibration frequency**	**Previous Calibration date**	**Last Calibration Date**
TI-95006	SN:02340218	AMMONIA TEMP TO ENVINOX	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
TI-95070	SN:02389946	Talgas to reactor			05/02/2014
TI-95071	SN:02389947 /03308054	NATURAL GAS TEMP	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
TI-95020	SN:02340228	TAILGAS OUTLET FROM ENVINOX TEMP			
TI-95072	SN:02389948 /49490828	TAILGAS OUTLET FROM ENVINOX TEMP	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
FIC-95001 Transmitter	SN:3807542	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change	15/08/2013	05/02/2014
FIC-95001 Sensor	SN:14206002	AMMONIA FLOW TO ENVINOX	+/- Every 6 months or a Gause change	15/08/2013	05/02/2014
FIC-95060 Transmitter	SN:3816752	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	15/08/2013	05/02/2014
FIC-95060 Sensor	SN:14257727	NATURAL GAS FLOW TO ENVINOX	+/- Every 6 months or a Gause change	15/08/2013	05/02/2014
FI-95013	SN:9084943	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
FI-95013_PT_C	SN:	TAILGAS OUTLET FLOW			
FI-95014	SN:9084944	TAILGAS OUTLET FLOW	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
FI-95014_PT_C	SN:	TAILGAS OUTLET FLOW			
FI-95015	SN:1223797	TAILGAS OUTLET FLOW	Part of Durag	03/04/2013	Must not be remove
FI-95015_PT_C	SN:	TAILGAS OUTLET FLOW			
PT-95015	SN:8953776	TAILGAS OUTLET FLOW			05/02/2014
PI-95027	SN:8953784	AMMONIA PRESSURE	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
PI-95040	SN:9084940	NATURAL GAS PRESSURE			05/02/2014
PI-95041	SN:9084941	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
PI-95042	SN:9084942	TAIL GAS PRESSURE	+/- Every 6 months or a Gause change	14/08/2013	05/02/2014
PI-95003_A	SN:8953762	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
PI-95003_B	SN:8953763	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
PI-95003_C	SN:8953765	AMMONIA PRESSURE TO BURNER	+/- Every 6 months or a Gause change	Change transmitter SN:9051235	03/02/2014
FI-95003_A	SN:8953743	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
FI-95003_B	SN:8953744	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
FI-95003_C	SN:9051234	AMMONIA FLOW TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
TI-95003_A	SN:02340214	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
TI-95003_B	SN:02340215	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
TI-95003_C	SN:02377804	AMMONIA TEMP TO BURNER	+/- Every 6 months or a Gause change		03/02/2014
DY-95023	SN:3811087 TRANSMITTER	HNO CONSENTRATE	+/- Every 6 months or a Gause change	15/08/2013	05/02/2014
DI-95023	SN:14206070 SENSOR	HNO CONSENTRATE	+/- Every 6 months or a Gause change	15/08/2013	05/02/2014
TI-95012_A	SN:02409991	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_B	SN:02409992	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95012_C	SN:02409993	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_A	SN:02409994	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_B	SN:02409995	GAUZE TEMP	+/- Every 6 months or a Gause change		
TI-95016_C	SN:02409996	GAUZE TEMP	+/- Every 6 months or a Gause change		
AI-95004	SN:3710103054099	INLET ANALYSER MLT	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	21/08/2013	21/08/2013
			AST Annually	24/06/2013	24/06/2013
			QAL 2 every 3 years		
AI-95005	SN:9910103055428	OUTLET ANALYSER CLD	Main Service once a year. Calibration done automaticaly.Zero every day. Span every second day	21/08/2013	21/08/2013
			AST Annually	24/06/2013	24/06/2013
			QAL 2 every 3 years		
Durag D-FL 100		Volume Flow Meusure System		24/06/2013	24/06/2013

QAL1

In accordance with EN 14181, the monitoring system for N_2O concentration measurements shall have been proven suitable for its measuring task (parameter and composition of the flue gas) by

use of the QAL1 procedure as specified by EN ISO 15267 or equivalent standards. This standard's objective is to prove that the total uncertainty of the results obtained from the AMS meets the specification for uncertainty stated in the applicable regulations. Such suitability testing has to be carried out under specific conditions by an independent third-party on a specific testing site.

QAL2

QAL2 is a procedure for the determination of the calibration function and its variability. According to EN 14181, the QAL2 test including the SRM need to be conducted by an independent testing house or laboratory which has to be accredited to EN ISO/IEC 17025. The QAL2 tests are performed on suitable AMS that have been correctly installed and commissioned on-site (as opposed to QAL1 which is conducted off-site).
A calibration function is established from the results of a number of parallel measurements performed with a Standard Reference Method (SRM). The variability of the measured values obtained with the AMS is then evaluated by the independent qualified "testing house".
QAL2 tests are to be performed at least every 5 years according to EN 14181.
Details on QAL2-tests can be found in the parameter section within D.2.

AST

In addition, Annual Surveillance Tests (AST) should be conducted in accordance with EN 14181; these are a series of measurements with independent measurement equipment in parallel to the existing AMS. The AST tests are performed annually. If a full QAL2 test is performed (at least every 5 years), an additional AST test is not necessary in that same year.
Details on AST-tests can be found in the parameter section within D.2.

QAL3

QAL3 describes the on-going quality assurance and maintenance procedures and documentation for the AMS conducted by the plant operator. With this documentation it can be demonstrated that the AMS is in control during its operation so that it continues to function within the required specifications.
In essence, staff performs QAL3 procedures through the established calibration procedures as outlined for the applicable parameter in section D.2.

N_2O-Analyser Zero Calibration

Conditioned ambient air is used as reference gas for zero calibration. The zero calibration is conducted automatically every 24 hours.

N_2O-Analyser Span calibration

For automatic span calibrations the Emerson D-EMS- 2000 Analyser is equipped with automatic calibration, installed as part of the analyser. The Automatic calibration is done after every second automatic zero point calibration. Manual calibration checks are done with certified calibration gas at least every 2 weeks. The calibration results and subsequent actions are all documented as part of the CDM procedure. In addition, the analyser room and equipment is visually inspected on a regular basis.

Flow meter calibration procedures

The flow meter itself does not need to be calibrated since it is a physical device which will not have drift. Therefore, it is sufficient to regularly inspect its physical condition by means of visual and electric checks of the probe. It shall be cleaned if deemed necessary. In addition the flow meter is checked during the QAL2 and AST tests by an independent laboratory by comparison to a standard reference method (SRM) as stated above.

Organization Structure with Management & Operation Process

As an operator of nitric acid plants since many years, the plant's staff in general and its instrument department in particular have been accustomed to operating technical equipment adhering to high quality standards.
Omnia has trained the staff selected for the operation of the relevant monitoring systems and ensures that the operational standards required for the appropriate handling of the equipment will

be maintained throughout the crediting period. Measuring instruments will be calibrated by the instrumentation engineer in accordance with the requirements of the instrument suppliers. The operations and equipment engineers of the nitric acid plant are responsible for the daily operation and maintenance of the systems.

The monitoring of the parameters for the determination of the mass flow of the N_2O will be the responsibility of the monitoring department. All relevant data will be recorded automatically and stored on electronic media.

Data Processing

Archiving of data

In accordance with the PDD, all of the data collected for the project activity must be stored in electronic format for the duration of the crediting period + 2 years. To meet these criteria, Omnia provides an extensive data storage system covering both the raw data received by the Delta V DCS as well as the output reports from the Durag system and drives and the main server as follows:

- All data collected by the Delta V DCS is stored on its internal hard drive for 1 month.
- Raw data collected by the DCS is downloaded weekly and stored, in MDI file format that cannot be tampered, on CDs a copy of which is stored in Omnia's on site safe. UHDE requests CDs from the system and sent to them, the technology provider, on a quarterly basis.
- All data is also backed up on one of the three hard drives on the plant's computer server and retained there for the duration of the year crediting period + 2 years.
- The EnviNox data are stored on the plant durag system and is designed to carry the full crediting + 2 years. This system comprises of two hard disc drives, as a backup to the process.
- The durag is further backed up as read only via the network o the factory server and back-up device which is stored off-site.
- The EnviNox data on the server is backed also, up to an external USB HDD which is kept at the parent company's head office and also retained there for the duration of the crediting period + 2 years.

Audit function and management review

The Project Manager arranges for an internal audit of the management system once per year. The auditor will not be involved in the daily operation of the plant and if necessary, may be sourced from a third party. The auditor will assess the implementation of the monitoring procedure, quality assurance steps and data collection and archiving. Audit findings, and steps taken to address findings will be recorded and reviewed in a Management Review meeting (convened at least annually) at which time the effectiveness of these procedures will be reviewed and necessary changes implemented.

SECTION D. Data and parameters

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

Data / Parameter:	$EF_{default,y}$
Unit:	$kgN_2O/tHNO_3$
Description:	Default N_2O baseline emissions factor in the calendar year y of the monitoring period n
Source of data:	According to ACM0019 Version 01.0.0, the default N_2O baseline emission factor 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	Emissions factor ($kgN_2O/tHNO_{3)}$
2005	5.10
2006	4.90
2007	4.70
2008	4.60
2009	4.40
2010	4.20
2011	4.10
2012	3.90
2013	3.70
2014	3.50
2015	3.40
2016	3.20
2017	3.00
2018	2.80
2019	2.70
2020	2.50
2021	2.50
Year n	2.50

Value(s) applied):	Not applicable
Purpose of data:	No measurement procedures, specified in the methodology.
Additional comment:	The decrease in the value for the baseline emission factor over time is to reflect the technological development. Please note that the factual business as usual emissions are estimated to be 6.45 $kgN_2O/tHNO_3$.

Data / Parameter:	GWP_{N2O}
Unit:	tCO_2e/tN_2O
Description:	Global warming potential of the nitrous oxide
Source of data:	Relevant decisions by the CMP

Value(s) applied):	310
Purpose of data:	Calculation of Baseline emissions or baseline net GHG removal by sinks
Additional comment:	-

Data / Parameter:	R_u
Unit:	$Pa,m^3/kmol.K$
Description:	Universal ideal gas constant
Source of data:	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
Value(s) applied):	8,314
Purpose of data:	Calculation of Baseline emissions or baseline net GHG removal by sinks
Additional comment:	-

Data / Parameter:	MM_i
Unit:	kg/mol
Description:	Molecular mass of greenhouse gas *i* (N_2O)
Source of data:	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
Value(s) applied):	44.02
Purpose of data:	Calculation of Baseline emissions or baseline net GHG removal by sinks
Additional comment:	-

Data / Parameter:	P_n
Unit:	Pa
Description:	Total pressure at normal conditions
Source of data:	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
Value(s) applied):	101,325
Purpose of data:	Calculation of Baseline emissions or baseline net GHG removal by sinks
Additional comment:	-

Data / Parameter:	T_n
Unit:	K
Description:	Temperature at normal conditions
Source of data:	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
Value(s) applied):	273.15
Purpose of data:	Calculation of Baseline emissions or baseline net GHG removal by sinks
Additional comment:	-

Data / Parameter:	$T_{open,n}$
Unit:	%
Description:	Fraction of time in monitoring period n during which the by-pass valve on the line feeding the tertiary N_2O abatement facility was open to vent the gas directly to the atmosphere.
Source of data:	ACM0019 v.01.0.0

Value(s) applied):	0
Purpose of data:	Calculation of Baseline emissions or baseline net GHG removal by sinks
Additional comment:	No by-pass is foreseen in the project design and therefore no by-pass valve will be installed from the beginning of the project activity. If necessary, plant will shut down.

D.2. Data and parameters monitored

Data / Parameter:	$P_{NA,n}$
Unit:	$tHNO_3$
Description:	Nitric Acid Produced
Measured/ Calculated / Default:	Measured and Calculated
Source of data:	Volume of HNO_3 is continuously measured by a flow meter. Density & acid concentration are determined by laboratory analysis
Value(s) of monitored parameter:	496 967
Monitoring equipment:	Coriolis Meter Density & acid concentration are determined by laboratory analysis.
Measuring/ Reading/ Recording frequency:	HNO_3: continuously Density & concentration analysis: approximately 12 samples per day are collected, which is sent to the plant laboratory for analysis. Another sample is taken daily to the central laboratory for analysis.
Calculation method (if applicable):	Flow measurements (Nm^3/h) are multiplied with density - and concentration readings to determine the $P_{NA,n}$ mass flow in $tHNO_3/h$
QA/QC procedures:	Maintenance and calibration of the flow meter and density meter has been applied under the internal QA/QC procedures implemented for this project activity. Omnia is accredited with ISO9001, ISO 14001 and OHS18000. All plant equipment and piping are designed as per ASME standards and their maintenance/QAQC is based on relevant API standards, vendor recommendations and prevailing practices in fertilizer industry. TAG number/ model specification of meter: FIT 95023/ Micro Motion
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	Calibration according to plant internal

Data / Parameter:	$F_{N2O,Tailgas,h}$
Unit:	kgN_2O/h
Description:	Mass Flow of N_2O in the gaseous stream of the tail gas in hours h
Measured/ Calculated / Default:	Measured and Calculated
Source of data:	N_2O concentration: Emerson N_2O Analyzer Stack gas volume flow: Durag Annubar D-FL 100 flow meter
Value(s) of monitored parameter:	Average value for this monitoring period: 1.32 Applied for the determination of $Q_{N2O,tailgas,n}$ and overall Project Emissions. See calculation sheet and sample calculation of section E.2.
Monitoring equipment:	N_2O concentration: Emerson N_2O Analyzer Stack gas volume flow: Durag Annubar D-FL 100 flow meter
Measuring/ Reading/ Recording frequency:	Continuously

Calculation method (if applicable):	□ The monitoring system should provide separate hourly average values for the N_2O concentration and the volume or mass flow of the tail gas based on 2 seconds (or shorter) interval readings that are recorded and stored electronically. These N_2O data sets shall be identified by means of a unique time / date key indicating when exactly the values were observed; □ The correction factors derived from the calibration curve of the QAL2 audit for the monitoring components as determined during the QAL2-test in accordance with EN 14181 must be applied to both the N_2O concentration and the volume or mass flow of the tail gas. This can either be applied automatically to the raw data recorded by the data storage system at the plant or it can be applied to the calculated hourly averages as part of the calculation of project emissions. If data for either the N_2O concentration or the volume or mass flow of the tail gas are not available for more than 1/3 of any hour while the plant was in operation, the value for that hour shall be replaced with the maximum value of N_2O concentration or volume or mass flow of the tail gas observed during the monitoring period. If data for neither the N_2O concentration nor the volume or mass flow of the tail gas are available for more than 1/3 of any hour while the plant was in operation, the maximum value of mass flow of N_2O calculated during the monitoring period shall be applied to any such hour. Values observed during five operating hours before and after a plant start-up and shut-down shall not be used for the determination of the maximum values. The hourly values are then aggregated as follows: 1) $Q_{N2O,\ by\text{-}pass;n} = EF_{BL,\ N2O,n} * P_{NA.n} * T_{open,n} * 10^{-3}$ $Q_{N2O,tailgas,\ n}$ = Amount of N_2O released through the tail gas of the project plant to the atmosphere in monitoring period *n* (tN_2O) $F_{N2O,\ tailgas,h}$ = Mass flow of N_2O in the gaseous stream of the tail gas in the hour h (kgN_2O/h) h_n = Number of hours in monitoring period n during which the plant was in operation
QA/QC procedures:	Overall measurement accuracy +/- 0.5% of the adjusted range Serial Number SN:9910103055428 Tag No. AI-95005 Outlet Analyser Date of AST test: 24.06. till 29.06.2013 Date of previous AST test: 23.06. till 29.06.2012 Date of next AST test: 2014 Date of previous QAL2 test: 24.06. till 29.06.2013 Date of next QAL2 test: 2015

Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	According to EN 14181, the flow meter and the analyser will be tested and calibrated by an external laboratory with EN ISO IEC 17025 Accreditation. The QAL2 test is conducted once every 5 years; the AST test is conducted once per year. Every 5 years the AST test is part of the QAL2 test. QAL2-3 calibration schedules are performed according to plant internal procedures:

Data / Parameter:	H_n
Unit:	Hours
Description:	Number of hours in monitoring period n the plant was in operation
Measured/ Calculated / Default:	Measured
Source of data:	Omnia production log and continuous monitoring according to operational parameters
Value(s) of monitored parameter:	13 362
Monitoring equipment:	The total operating hours are logged continuously in the production log
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	-

Data / Parameter:	$T_{open,n}$
Unit:	%
Description:	Fraction of time in monitoring period *n* during which the by-pass valve on the line feeding the tertiary N_2O abatement facility was open to vent the gas directly to the atmosphere.
Measured/ Calculated / Default:	Measured
Source of data:	N/A

Value(s) of monitored parameter:	0
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	N/A
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	No by-pass is foreseen in the project design and therefore no by-pass valve will be installed from the beginning of the project activity. If necessary, plant will shut down.

Data / Parameter:	$PE_{FF,n}$
Unit:	tCO_2e
Description:	Project emissions related to fossil fuel input to the destruction facility and/or re-heater in monitoring period *n* (tCO_2)
Measured/ Calculated / Default:	Calculated
Source of data:	The emissions related to the operation of the N_2O destruction facility include only on-site emissions due to fossil fuel use as input to the N_2O destruction facility. Natural gas consumption will be measured by a mass-flow meter
Value(s) of monitored parameter:	1 913
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Continuously

Calculation method (if applicable):	Calculated based on measurement of natural gas consumption according to the following formula, as provided in the applicable tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (Version 02): 2) $PE_{FF,n} = PE_{FC,i,j,}$ 3) $PE_{FC,j,n} = \sum_i FC_{i,j,n} * COEF_{i,n}$ 4) $COEF_{i,n} = NCV_{i,n} * EF_{CO2,i,n}$ Where: $PE_{FC,j,n}$ = CO_2 emissions from fossil fuel combustion in process *j* in monitoring period *n* (tCO_2/n) $FC_{i,j,n}$ = Quantity of fuel type *i* combusted in the process *j* during the monitoring period *n* (mass or volume unit/n) $COEF_{i,n}$ = CO_2 emission coefficient of fuel type *i* in monitoring period *n* (tCO_2/mass or volume unit) i = fuel types combusted in process *j* during monitoring period *n* $W_{c,i,y}$ = Weighted mass average fraction of carbon in fuel type i in year y
QA/QC procedures:	Maintenance and calibration of the mass flow meter is applied under the internal QA/QC procedures. Overall measurement accuracy +/- 0.5% of the adjusted range Serial Number SN:9910103055428 Tag No. AI-95005 Outlet Analyser Date of AST test: 24.06. till 29.06.2013 Date of previous AST test: 23.06. till 29.06.2012 Date of next AST test: 2014 Date of previous QAL2 test: 24.06. till 29.06.2013 Date of next QAL2 test: 2015
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	Calibration procedures are performed according to plant internal procedure

Data / Parameter:	$W_{c,i,n}$
Unit:	tC/mass unit of fuel type natural gas

Description:	Weighted average mass fraction of carbon in fuel type *i* in year *y*
Measured/ Calculated / Default:	Measured
Source of data:	The following data source may be used if the relevant conditions apply: Data Source: a) Values provided by the fuel supplier in invoices — Conditions for using the data source: This is the preferred source Data Source: b) Measurements by the project participants — Conditions for using the data source: If a) is not available **Option a)** has been applied since values from the supplier have not been available.
Value(s) of monitored parameter:	0.9141
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	The mass fraction of carbon should be obtained for each fuel delivery, from which weighted average annual values should be calculated.
Calculation method (if applicable):	
QA/QC procedures:	Verify if the values under a) and b) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in b) should have ISO17025 accreditation or justify that they can comply with similar quality standards.
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	

Data / Parameter:	$FC_{i,j,n}$
Unit:	Mass unit per monitoring period (ton)
Description:	Quantity of fuel type i combusted in process j during the monitoring period n
Measured/ Calculated / Default:	Measured
Source of data:	Measurements from Micro Motion (Rosemount)
Value(s) of monitored parameter:	651 t

Monitoring equipment:	Micro motion (Rosemount)
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	-
QA/QC procedures:	Overall measurement accuracy +/- 0.5% of the adjusted range Serial Number SN:14257727 Tag No. FI-95060 New Installation
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	Calibration schedules are performed according to plant internal procedure.

Data / Parameter:	Vt,wb
Unit:	Nm3 wet gas/h
Description:	Volumetric Flow of the gaseous stream in time interval t on a wet basis
Measured/ Calculated / Default:	Measured
Source of data:	Measurements from Durag Annubar flow meter
Value(s) of monitored parameter:	Average Value: 118795
Monitoring equipment:	Durag Annubar Flow meter
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	-
QA/QC procedures:	Overall measurement accuracy +/- 0.5% of the adjusted range Serial Number SN:9084944 Tag No. FI-95014 Date of AST test: 24.06. till 29.06.2013 Date of previous AST test: 23.06. till 29.06.2012 Date of next AST test: 2014 Date of previous QAL2 test: 24.06. till 29.06.2013 Date of next QAL2 test: 2015
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	Calibration schedules are performed according to plant internal procedures

Data / Parameter:	$V_{i,t,db}$
Unit:	m^3 gas i/m^3 dry gas
Description:	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis
Measured/ Calculated / Default:	Continuously
Source of data:	-
Value(s) of monitored parameter:	0
Monitoring equipment:	Emerson N_2O Analyser
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	-
QA/QC procedures:	Calibration includes zero verification with an inert gas (e.g. N_2) and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). All calibration gases have a certificate provided by the manufacturer and are under their validity period.
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	Calibration schedules are performed according to plant internal procedures

Data / Parameter:	T_t
Unit:	°C
Description:	Temperature in the gaseous stream in time interval t
Measured/ Calculated / Default:	Measured
Source of data:	Tail Gas temperature measurement
Value(s) of monitored parameter:	137.48
Monitoring equipment:	Thermocouples
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	-

QA/QC procedures:	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	As parameters are converted to normal conditions during the monitoring process, this parameter is not needed. Calibration schedules are performed according to plant internal procedures

Data / Parameter:	P_t
Unit:	Pa
Description:	Pressure of the gaseous stream in time interval t
Measured/ Calculated / Default:	Measured
Source of data:	Pressure probe
Value(s) of monitored parameter:	80 060
Monitoring equipment:	Pressure probe
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	-
QA/QC procedures:	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	As parameters are converted to normal conditions during the monitoring process, this parameter is not needed. Calibration schedules are performed according to plant internal procedures

Data / Parameter:	ER_n
Unit:	tCO_2e
Description:	Emission reduction in monitoring period

Measured/ Calculated / Default:	Calculated
Source of data:	-
Value(s) of monitored parameter:	522 916
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	5) $ER_n = BE_n - PE_n$
QA/QC procedures:	
Purpose of data:	Calculation of project emissions or actual net GH removals by sinks
Additional comment:	

D.3. Implementation of sampling plan

>>
Not applicable

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

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

>>
Baseline emissions:
The calculation of the baseline emissions or baseline net GHG removals sinks has been established in accordance with ACM0019 Version 01.0.0. The formulae are numbered according to the according to the numbering in the registered PDD.

$$(1) \qquad BE_n = P_{NA,n} * EF_{BL,\,N2O,n} * GWP_{N2O} * 10^{-3}$$

Where:
BE_n = Baseline emissions in monitoring period n (tCO_2e)
$P_{NA,n}$ = Nitric acid produced in the monitoring period n ($tHNO_3$)
$EF_{BL,\,N2O,n}$ = Baseline N_2O emission factor for nitric acid production in the monitoring period n ($kgN_2O/tHNO_3$).
GWP_{N2O} = Global Warming Potential of N_2O valid for the commitment period (310 tCO_2e)

Sample calculation applying summed-up values of the whole monitoring period

Year	$EF_{BL,N2O,n}$	P_{NA}	GWP_{N2O}	BE_n
2012	3.9	93 510	310	113 053
2013	3.7	274 145	310	313 039
2014	3.5	129 312	310	139 403

Determination of the baseline N_2O emission factor ($EF_{BL,N2O,n}$)

The baseline N_2O emission factor in the monitoring period n ($EF_{BL,N2O,n}$) shall be determined as a default emission factor $EF_{default,y}$ given for each calendar year y for which BE_n is calculated (see monitoring table for $EF_{default,y}$), as follows:

(2) $EF_{BL, N2O,n} = EF_{default, y}$

Where:

$EF_{BL, N2O,n}$ = Baseline N_2O emission factor for nitric acid production in the monitoring period n ($kgN_2O/tHNO_3$).

$EF_{default, y}$ = Default N_2O baseline emissions factor in the calendar year of the monitoring period n ($kgN_2O/tHNO_3$) (see list of EFdefault, y values under B.6.2).

Year	$EF_{BL, N2O,n}$	$EF_{default, y}$
2012	3.90	3.90
2013	3.70	3.70
2014	3.50	3.50

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

>>

Project emissions include emissions of N_2O which have not been destroyed by the project activity and, in case of the installation of a tertiary N_2O abatement facility, CO_2 emissions resulting from the operation of the N_2O abatement facility.

Project emissions are calculated using the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (Version 02) referred to in ACM0019.
Project emissions are calculated as follows:

(3) $PE_n = PE_{N2O,n} + PE_{CO2,tertiary,n}$

Where:

PE_n = Project emissions in monitoring period n (tCO_2e)

$PE_{N2O,n}$ = Project emissions of N_2O from the project plant in monitoring period n (tCO_2e)

$PE_{CO2 ,tertiary,n}$ = Project emissions of CO_2 from the operation of the tertiary N_2O abatement facility in monitoring period n (tCO_2)

Sample calculation applying summed-up values of the whole monitoring period:

PE_n	PE_{N2O}	$PE_{CO2,tertiary,n}$
5 326	3 412	1 914

The amount of N_2O emissions from the project activity includes two emission sources:

- The N_2O contained in the tail gas stream of the plant which is released to the atmosphere and;
- In the case of a tertiary N_2O abatement, the N_2O contained in any by-pass streams to the tertiary N_2O abatement facility.

(4) $PE_{N2O,n} = (Q_{N2O,tail\ gas,n} + Q_{N2O,by\text{-}pass,n}) * GWP_{N2O}$

Where:

$PE_{N2O,n}$ = Project emissions of N_2O from the project plant in monitoring period (tCO2e)

$Q_{N2O,tail\ gas,n}$ = Amount of N_2O released through the tail gas of the project plant to the atmosphere in monitoring period n (tN_2O)

$Q_{N2O,by\text{-}pass,n}$ = Amount of N_2O released through the by-pass to a tertiary N_2O abatement system to the atmosphere in monitoring period n (tN_2O)

GWP_{N2O} = Global warming potential of N_2O valid for the commitment period (310 tCO_2e)

Sample calculation applying summed-up values of the whole monitoring period:

PE_{N2O}	$Q_{N2O,tailgas,n}$	$Q_{N2O,bypass,n}$	GWP_{N2O}
3 412	11	0	310

The methodology and for keeping up flexibility in the event of a possible by-pass installation at a later point of time the parameter $T_{open,n}$ will be monitored throughout the crediting period and has been added to section B.7.1.

Determination of $Q_{N2O,tail\ gas,n}$

The amount of N_2O emissions from the tail gas stream of the project plant shall be determined using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream." In applying the tool, the following provisions apply:

- Throughout the crediting periods of the project activity, the N_2O concentration and volume or mass flow of the tail gas are to be monitored continuously. The monitoring system is to be installed and maintained throughout the crediting period based on the European Norm 14181 (2004), or any more recent update of that standard;
- The monitoring system should provide separate hourly average values for the N_2O concentration and the volume or mass flow of the tail gas based on 2 seconds (or shorter) interval readings that are recorded and stored electronically. These N_2O data sets shall be identified by means of a unique time / date key indicating when exactly the values were observed;
- The correction factors derived from the calibration curve of the QAL2 audit for the monitoring components as determined during the QAL2-test in accordance with EN 14181 must be applied to both the N_2O concentration and the volume or mass flow of the tail gas. This can either be applied automatically to the raw data recorded by the data storage system at the plant or it can be applied to the calculated hourly averages as part of the calculation of project emissions;
- If data for either the N_2O concentration or the volume or mass flow of the tail gas are not available for more than 1/3 of any hour while the plant was in operation, the value for that hour shall be replaced with the maximum value of N_2O concentration or volume or mass flow of the tail gas observed during the monitoring period. If data for neither the N_2O concentration nor the volume or mass flow of the tail gas are available for more than 1/3 of any hour while the plant was in operation, the maximum value of mass flow of N_2O calculated during the monitoring period shall be applied to any such hour. Values observed during five operating hours before and after a plant start-up and shut-down shall not be used for the determination of the maximum values.

According to the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0) the mass flow of greenhouse gas i in the gaseous stream in time interval t ($F_{i,t}$) is calculated based on measurements of

a) The total volume flow or mass flow of the gas stream and
b) The volumetric fraction of the gas in the gaseous stream and
c) The water content and gas composition.

The tool covers possible measurement options, providing six different calculation options to determine the volume or mass flow of a particular greenhouse gas (A-F).

Furthermore, the tool provides two options for the determination of the moisture content of the gaseous stream, while Option 2 (simplified calculation without measurement of the moisture content) will be applied.

This option provides a simple and conservative approach to determine the absolute humidity by assuming the gaseous stream is dry or saturated depending on which is the conservative situation. In order to follow a conservative approach for the determination of the project emissions the gaseous stream is assumed to have a moisture content of "0" and is therefore considered dry.
As the gaseous stream is assumed to be dry Option B is chosen for the calculation of the mass flow of greenhouse gas i ($F_{i,t}$), which is calculated as follows:

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

With

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

Where:

$F_{i,t}$ = mass flow of greenhouse gas N_2O in the gaseous stream in time interval t (kg gas /h)
$V_{t,db}$ = Volumetric flow of the gaseous stream in time interval t, on dry basis (m^3 dry gas/h)
$v_{i,t,db}$ = Volumetric fraction of greenhouse gas N_2O in the gaseous stream in a time interval t on a dry basis (m^3 gas N_2O/m^3 dry gas)
$\rho_{i,t}$ = Density of greenhouse gas N_2O in the gaseous stream in a time interval t (kg gas N_2O/m^3 gas N_2O)
P_t = Absolute pressure of the gaseous stream in time interval t (Pa)
MM_i = Molecular mass of greenhouse gas N_2O (kg/kmol)
R_u = Universal ideal gases constant ($Pa.m^3/kmol.K$)
T_t = Temperature of the gaseous stream in time interval t (K)

Sample calculation for equation (5) applying values from 29/05/2014 00:00:

$F_{i,t}$	$V_{t,db}$	$v_{i,t,db}$	$\rho_{i,t}$
3.80	164 101	0	1.10

Calculation for equation (6) applying summed up values for the whole of the monitoring period:

$\rho_{i,t}$	P_t	MM_{N2O}	R_u	T_t
1.10	85 512	44.02	8314	411.94

The volumetric flow of the gaseous stream in time interval t on a dry basis ($V_{t,db}$) is determined by converting the measured volumetric flow from wet basis to dry basis. The absolute humidity of the gaseous stream (mH2O,t,db) is determined using Option 2 above and accordingly set to be 0. Consequently, equation (8) will result in 0 and thus equation (7) will result in:

(7) $$Q_{N2O,tailgas,n} = \sum_{h=1}^{h=h_n} F_{N2O,tailgas,h} * 10^{-3}$$

Where:

$Q_{N2O,tailgas,n}$ = Amount of N_2O released through the tail gas of the project plant to the atmosphere in monitoring period n (tN_2O)
$F_{N2O,tailgas,h}$ = Mass flow of N_2O in the gaseous stream of the tail gas in the hour h (kgN_2O/h)
h_n = Number of hours in monitoring period n during which the plant was in operation

Sample calculation applying summed-up values of the whole monitoring period:

$Q_{N2O,tailgas,n}$	$\Sigma F_{N2O,tail\ gas,h}$
11.0	768

During any periods in which a tertiary abatement system is by-passed, $F_{N2O,tailgas,h}$ is set to zero in order to avoid double counting of project emissions.

$$(8) \qquad Q_{N2O,\ by\text{-}pass;n} = EF_{BL,\ N2O,n} * P_{NA.n} * T_{open,n} * 10^{-3}$$

Where:

$Q_{N2O,\ by\text{-}pass;n}$ = Amount of N_2O released through the by-pass to a tertiary N_2O abatement system to the atmosphere in monitoring period n (tN_2O)

$EF_{BL,\ N2O,n}$ = Default N_2O baseline emissions factor in the calendar year y of the monitoring period n ($kgN_2O/t\ HNO_3$)

$P_{NA.n}$ = Nitric acid produced in the monitoring period n ($tHNO_3$)

$T_{open,n}$ = Fraction of time in monitoring period n during which the by-pass valve on the line feeding the tertiary N_2O abatement facility was open to vent the gas directly to the atmosphere.

Sample calculation applying summed-up values of the whole monitoring period:

$Q_{N2O,bypass,n}$	$EF_{BL,N2O,n}$	P_{NA}	$T_{open,n}$
0	3.90	496 967	0

The emissions related to the operation of the N_2O destruction facility include only on-site emissions due to the fossil fuel use as input to the N_2O destruction facility:

Project emissions from the operation of the tertiary N_2O abatement facility ($PE_{CO2,tertiary,n}$)

The emissions related to the operation of the N_2O destruction facility include only on-site emissions due to the fossil fuel use as input to the N_2O destruction facility:

$$(9) \qquad PE_{CO2,tertiary,n} = PE_{FF,n}$$

Where:

$PE_{CO2,tertiary,n}$ = Project emissions of CO_2 from the operation of the tertiary N_2O abatement facility in monitoring period n (tCO_2)

$PE_{FF,n}$ = Project emissions related to fossil fuel input to the destruction facility and/or re-heater in monitoring period n ($t\ CO_2$)

For the determination of the project emissions related to the operation of the tertiary abatement system in monitoring period n the project proponents are required to use the latest version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion."

The parameter $PE_{FC,j,y}$ used in the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" corresponds to the parameter $PE_{FF,n}$ in the applied methodology:

$$(10) \qquad PE_{FF,n} = PE_{FC,i,j,}$$

CO_2 emissions from fossil fuel combustion in process j are calculated based on the quantity of fuels combusted and the CO_2 emission coefficient of those fuels, as follows:

$$(11) \qquad PE_{FC,j,n} = \sum_i FC_{i,j,n} * COEF_{i,n}$$

Where:

$PE_{FC,j,n}$ = CO_2 emissions from fossil fuel combustion in process j in monitoring period n (tCO_2/n)
$FC_{i,j,n}$ = Quantity of fuel type i combusted in the process j during the monitoring period n (mass or volume unit/n)

$COEF_{i,n}$= CO_2 emission coefficient of fuel type i in monitoring period n (tCO2/mass or volume unit)
i = fuel types combusted in process j during monitoring period n

Sample calculation applying summed-up values of the whole monitoring period:

$PE_{CO2,tertiary,n}$	$\Sigma FC_{i,j,n}$	$COEF_{i,n}$
1 914	651	3.3517

As data about the chemical composition of the fuel type i is available COEFi,n is calculated based on its chemical composition of the fossil fuel type i using Option A of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (Version 02):

$$(12) \quad COEF_{i,n} = W_{c,i,n} * 44/12$$

Where:

$COEF_{i,n}$ = CO_2 emission coefficient of fuel type i in monitoring period n (tCO_2/mass or volume unit)
$wC_{,i,n}$ = Is the weighted average mass fraction of carbon in fuel type i in monitoring period n (tC/mass unit of the fuel)

Sample calculation applying summed-up values of the whole monitoring period:

$COEF_{i,n}$	$W_{c,i,n}$	
3.3517	91.41	44/12

$wC_{,i,y}$ is calculated according to a mass fraction calculation of carbon in the fuel type applied

Name	Molecular Weight	Unit	Percentage Fraction
MC	12.0107	g/mol	
MCH_4	16.043	g/mol	91.41
MC_2H_6	30.07	g/mol	3.18
MCO_2	44.01	g/mol	1.68

E.3. Calculation of leakage

>>
Any leakage emissions sources are deemed to be negligible.

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total	442 385	4 498	0	437 887

E.5. Comparison of actual emission reductions or net anthropogenic 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_2e)	635 136	437 887

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

>>

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_2e)	15 205	422 682

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

Project participant and/or responsible person/ entity	☐ Project participant ☒ Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Omnia Fertilizer, Division of Omnia Group (Pty) Ltd.
Street/P.O. Box	P.O Box 384, Eugene Houndrey Street (Cul-de sac)
Building	-
City	Sasolburg
State/Region	Free State
Postcode	1947
Country	South Africa
Telephone	+27 169707429
Fax	
E-mail	PvdMerwe@omnia.co.za
Website	www.omnia.co.za
Contact person	Pieter van der Merwe
Title	General Manager Production
Salutation	Mr
Last name	van der Merwe
Middle name	
First name	Pieter
Department	Nitrates Complex
Mobile	+2783 252 4854
Direct fax	
Direct tel.	+2716 970 7429
Personal e-mail	PvdMerwe@omnia.co.za

Attachment. Instructions for filling out the monitoring report form

1. General instructions

1. When monitoring the project activity and completing the CDM-MR-FORM, in addition to following the the "CDM project standard" (Project standard), the applied approved baseline and monitoring methodology(ies) (hereinafter referred to as the applied methodology(ies)) and, where applicable, the applied approved standardized baseline(s) (hereinafter referred to as the applied standardized baseline(s)), consult the "Rules and References" section of the UNFCCC CDM website <http://unfccc.int/>, which contains all regulatory documents for the CDM, such as standards (including methodologies, tools and standardized baselines), procedures, guidelines, clarifications, forms and the "Glossary of CDM terms".

2. Make any data, values and formulae included in electronic spreadsheets provided accessible and verifiable.

3. Complete the CDM-MR-FORM and all attached documents in English, or contain a full translation of relevant sections in English.

4. Complete the CDM-MR-FORM using the same format without modifying its font, headings or logo, and without any other alteration to the form.

5. Do not modify or delete tables and their columns in the CDM-MR-FORM. Add rows of the tables as needed. Add additional appendices as needed.

6. If a section of the CDM-MR-FORM is not applicable, explicitly state that the section is left blank intentionally.

7. Use an internationally recognized format for presentation of values in the CDM-MR-FORM, for example use digits grouping in thousands and mark a decimal point with a dot (.), not with a comma (,).

8. Complete the CDM-MR-FORM deleting this Attachment "Instructions for filling out the monitoring report form".

2. Specific instructions

1. Indicate on the cover page the following information:
   - (a) Title of the project activity;
   - (b) Reference number of the project activity;
   - (c) Version number of the monitoring report;
   - (d) Completion date of the monitoring report (DD/MM/YYYY);
   - (e) Registration date of the project activity (DD/MM/YYYY);
   - (f) Monitoring period number and duration of this monitoring period (first and last days included (DD/MM/YYYY – DD/MM/YYYY));
   - (g) Project participant(s);
   - (h) Host Party(ies);
   - (i) Sectoral scope(s), applied methodology(ies) and, where applicable, applied standardized baseline(s);
   - (j) Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD;
   - (k) Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period;

(l) Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable);

(m) Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

1. Provide a brief summary of the detailed description given in section B.1 below in terms of:
   (a) Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks;
   (b) Brief description of the installed technology and equipment;
   (c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.);
   (d) Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period.

A.2. Location of project activity

1. Provide the following information on the location of the project activity:
   (a) Host Party(ies);
   (b) Region/ State/ Province, etc.;
   (c) City/ Town/ Community, etc.;
   (d) Physical/ Geographical location.

A.3. Parties and project participant(s)

1. List in the table below Party(ies) and project participant(s) involved in the project activity.

Party involved ((host) indicates 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)
Party A (host)	Private entity A Public entity A	
Party B	Private entity B Public entity B	
…	…	

A.4. Reference of applied methodology and standardized baseline

1. Indicate the exact reference (number, title, version) of:
   (a) The applied methodology(ies) (e.g. ACM0001: “Large-scale Consolidated Methodology: Flaring or use of landfill gas” (Version 15.0));
   (b) Any tools and other methodologies to which the applied methodology(ies) refers (e.g. " Methodological Tool: Tool for the demonstration and assessment of additionality" (Version 07.0.0));
   (c) The applied standardized baseline(s), where applicable (e.g. ASB0001 “Standardized baseline: Grid emission factor for the Southern African power pool” (Version 01.0)).
2. Refer to the UNFCCC CDM website for the exact reference of the applied methodologies, tools and standardized baselines.

A.5. Crediting period of project activity

1. Provide the type, start date and length of the crediting period corresponding to this monitoring period.

A.6. Contact information of responsible persons/ entities

1. Provide contact information of the person(s)/ entity(ies) responsible for completing the CDM-MR-FORM and indicate if the person(s)/ entity(ies) is also a project participant(s) in Appendix 1: below.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

1. Provide information on the implementation status of the project activity during this monitoring period in accordance with the applicable provision for description of implemented registered CDM project activity in the Project standard.
2. For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate.
3. In the case of a PoA, also provide information on whether a single monitoring report or two monitoring reports are prepared for the monitoring period. When the request for issuance for a monitoring period is to be submitted in two batches, provide separate monitoring reports corresponding to each of the batches, including information on whether the monitoring report covers the first batch or the second batch, and provide the reference numbers of CPAs that are included and not included separately.
4. If applicable, present information on any request for prior approval by the Board of changes to the registered CDM project activity in B.2.1, B.2.2, B.2.3, B.2.4 and/or B.2.5.

B.2. Post registration changes

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

1. Indicate whether any temporary deviations have been applied during this monitoring period. If applied, provide a description of the deviation(s) in accordance with applicable provisions for temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baseline in the Project standard.
2. Include the reasons for the deviation(s), how it deviates from the monitoring plan, applied methodology(ies) and/or applied standardized baseline, the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach.
3. For deviation(s) that require prior approval by the Board, include the date of approval and reference number.

B.2.2. Corrections

1. Indicate whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report.
2. In cases where the correction(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.

B.2.3. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

1. Indicate whether any permanent changes from the registered monitoring plan, applied methodologies or applied standardized baseline have been approved during this monitoring period or submitted with this monitoring report.
2. In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.

B.2.4. Changes to project design of registered project activity

1. Indicate whether any changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report.
2. In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.

B.2.5. Changes to start date of crediting period

1. Indicate whether any changes to the start date of the crediting period have been approved during this monitoring period or submitted with this monitoring report.
2. In cases where the changes and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number.

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

1. Indicate whether any changes specific to afforestation or reforestation project activities have been applied during this monitoring period based on applicable provisions in the Project standard that do not require prior approval by the Board. If changes were applied, provide the version number and the completion date of the revised PDD.

SECTION C. Description of monitoring system

1. Provide a description of the monitoring system based on the applicable provision for description of monitoring system in the Project standard. Include diagrams of the monitoring system and the information flow where appropriate.

SECTION D. Data and parameters

1. Provide information on all data and parameters in accordance with applicable provisions for data and parameters in the Project standard, using the tables provided in D.1 and D.2 below.
2. For “Purpose of data” in the tables in D.1 and D.2, choose one of the following options: (a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks; (c) Calculation of leakage.
3. Where the applied standardized baseline(s) standardizes baseline emissions, apply the standardized value(s) of the parameter(s) in section D.1 and/or D.2 below in accordance with applicable provisions related to data and parameters in the Project standard.

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

1. Include data that are fixed before registration and/or at the renewal of crediting period and are used during this monitoring period under section D.1.
2. For “Value(s) applied”, use one table to report multiple values referring to the same data and parameter, if applicable. Use reference(s) to electronic spreadsheets, if necessary.

(Copy this table for each piece of data and parameter.)

Data / Parameter:	
Unit:	
Description:	
Source of data:	
Value(s) applied):	
Purpose of data:	
Additional comment:	

D.2. Data and parameters monitored

1. For “Monitoring equipment” in the table below, provide information on type, accuracy class, serial number, calibration frequency, date of last calibration and validity.
2. For “Value(s) of monitored parameter”, use one table to report multiple values referring to the same data and parameter, if applicable. Use reference(s) to electronic spreadsheets, if necessary.

(Copy this table for each piece of data and parameter.)

Data / Parameter:	
Unit:	
Description:	

Measured/ Calculated / Default:	
Source of data:	
Value(s) of monitored parameter:	
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	
Calculation method (if applicable):	
QA/QC procedures:	
Purpose of data:	
Additional comment:	

D.3. Implementation of sampling plan

1. If data and parameters monitored described in section D.2 above are determined by a sampling approach, provide a description on how project participants implemented the sampling efforts and surveys for those data and parameters according to the sampling plan. Include:
   (a) Description of implemented sampling design;
   (b) Collected data (Attach and reference to electronic spreadsheets, if necessary);
   (c) Analysis of the collected data;
   (d) Demonstration on whether the required confidence/precision has been met.

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

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

1. Provide sample calculations for all formulae used and calculation of baseline emissions or baseline net GHG removals by sinks, applying actual values. Attach electronic spreadsheets to present full calculations in the monitoring report.

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

1. Provide sample calculations for all formulae used and calculation of project emissions or actual net GHG removals by sinks, applying actual values. Attach electronic spreadsheets to present full calculations in the monitoring report.

E.3. Calculation of leakage

1. Provide sample calculations for all formulae used and calculation of leakage, applying actual values. Attach electronic spreadsheets to present full calculations in the monitoring report.

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

1. Summarize the results of sections E.1, E.2, E.3 above and provide GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period, using the table below.

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total				

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

1. Provide a comparison of actual GHG emission reductions or net anthropogenic GHG removal of the project activity achieved during this monitoring period with the estimates in the 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_2e)		

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

1. Explain the cause of any increase in the actual GHG emission reductions achieved during this monitoring period based on the applicable provision for calculation of GHG emission reductions in the Project standard.

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

1. If the monitoring period starts before 31 December 2012 and ends anytime thereafter, provide actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved for the following two periods respectively: (a) Up to 31 December 2012 (1st commitment period); and (b) From 1 January 2013 onwards.
2. Calculate the achieved GHG emission reductions or net anthropogenic GHG removals by sinks proportionally for each period. In cases where annual caps were applied in the calculations, prorate the annual caps to each period.

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_2e)		

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

1. In accordance with A.6 above, complete the table below, with the following mandatory fields: Project participant and/or responsible person/ entity, Organization, Street/P.O. Box, City, Postcode, Country, Telephone, Fax, e-mail and Name of contact person. Copy and paste the table as needed.

Project participant and/or responsible person/ entity	☒ Project participant ☐ Responsible person/ entity for completing the CDM-MR-FORM
Organization name	
Street/P.O. Box	
Building	
City	
State/Region	
Postcode	
Country	
Telephone	
Fax	
E-mail	
Website	
Contact person	
Title	
Salutation	
Last name	
Middle name	
First name	
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	

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Document information

Version	*Date*	*Description*
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • 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 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.

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