CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

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Title: Jinan Chemical Fertilizer Co., Ltd. N_2O Abatement Project (Plant 2)
Version: 1.1
Date of completion: 18th, January 2008

A.2. Description of the project activity:

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Jinan Chemical Fertilizer Co., Ltd. N_2O Abatement Project (Plant 2) (hereafter referred to as the "Project") is developed by Jinan Chemical Fertilizer Co., Ltd. (hereafter referred to as "Jihua"). The purpose of the Project is to reduce the N_2O concentration in the tail gas from the Nitric Acid production Plant 2 of Jihua.

N_2O has been recognized as a potential Green House Gas (GHG) with a Global Warming Potential (GWP) of 310 compared to CO_2 which is responsible for approximately 6% of the greenhouse effect at present[1]. In the absence of the Project, the N_2O in the tail gas from the nitric acid Plant 2 is directly released to the atmosphere through the gas stack which results in great negative impacts on global climate change.

The Project will involve the installation of a dedicated N_2O abatement catalyst (secondary catalyst) inside the ammonia burner of the nitric acid Plant 2 at Jihua. The secondary catalyst will catalytically reduce N_2O, once it has been formed in the ammonia burner reactor and thus will contribute to reducing the N_2O concentration in the tail gas which is being relieved through the stack directly into the atmosphere. The emission reductions of the Project will amount to approximately 1,060 tN_2O annually which is equivalent to 328,600 tCO_2e/yr.

The Project will contribute to environmental and social benefits as well as to the sustainable development of the Host Country. In detail the Project's benefits are as follows:

- **Environmental benefits**
  The Project will directly reduce N_2O emissions which would otherwise be released to the atmosphere. This contributes to the improvement of global climate change and benefits the whole environment and human living conditions.

- **Social benefits**
  The installation of the N_2O abatement technology, including the secondary catalyst and the Automated Measuring System (AMS), which is an advanced technology in the Host Country, will improve the technology level within the local industry. At the same time the local staff, which will be trained in working with this advanced equipment, will benefit from the know how transfer Furthermore the transfer of technology, know-how and related quality assurance measures carried out together with respective capacity building activities is expected to improve the recognition of such technologies and affect environmental awareness of local staff and local people.

A.3. Project participants:

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[1] http://www.yptenc.org.uk/docs/factsheets./env_facts/glob_warm.html

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
P. R. China (Host)	Jinan Chemical Fertilizer Co., Ltd.	No
Switzerland	Vitol S.A.	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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P. R. China

A.4.1.2. Region/State/Province etc.:

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Shandong Province

A.4.1.3. City/Town/Community etc:

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Jinan City

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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The Project site is located at the east suburban industrial area of Jinan city, north from Jiaoji railway and Jiwang freeway, and south to Jiqing freeway and Jinan International airport. To the west from the Project site JingHu railway is located, which is of great importance to China's transportation infrastructure. The neighbour on the other side is Jinan Iron and Steel Group.

The Project site coordinates are as follows:

Longitude: 117°02' E
Latitude: 36°40' N

The geographical location of the Project site is shown in Figure 1 below.

Figure 1: Location of the project site

A.4.2. Category(ies) of project activity:

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Sectoral Scope 05: Chemical Industry

A.4.3. Technology to be employed by the project activity:

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In order to reduce the N_2O concentration in the tail gas of the nitric acid Plant 2, Jihua will install a layer of secondary catalyst inside the ammonia burner right below the primary catalyst gauze pack. The Project will use a proven N_2O abatement catalyst developed by a leading international supplier. The secondary catalyst will decompose N_2O into N_2 and O_2 based on the following reaction:

$$2N_2O \rightarrow 2N_2 + O_2$$

The N_2O abatement catalyst will be applied in form of pellets or like material which will be filled into a basket right below the primary catalyst gauze pack on top of the raschig rings. The installation of the N_2O abatement catalyst is schematically shown in Figure 2.

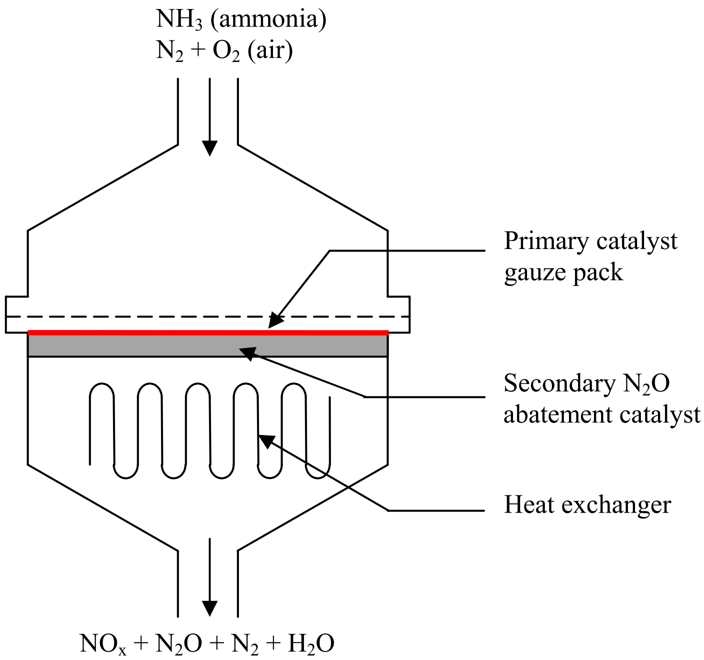

Figure 2: Installation of N2O catalyst

Besides, the Project the plant will be equipped with a new Automated Measuring System (AMS) which will monitor the tail gas parameters and record respective data including gas volume, N_2O concentration, temperature and pressure. The AMS, as supplied by ABB, will conform to the European Norm 14181 as required by the approved methodology AM0034 (Version 02).

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

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The renewable crediting period is chosen for the Project. The estimated total emission reductions during the first 7-year crediting period amount to 2,300,200 tons of CO_2e. The annual emission reductions within this first crediting period are listed below in Table 1:

Table 1: Emission reductions in the first crediting period

Years	**Annual estimation of emission reductions in tons of CO_2e**
2008 (July-December)	164,300
2009	328,600
2010	328,600
2011	328,600
2012	328,600
2013	328,600
2014	328,600
2015 (January-June)	164,300
Total estimated reductions (tons of CO_2e)tons	**2,300,200**
Total number of crediting years	7 years
Annual average over the crediting period of estimated reductions (tons of CO_2e)tons	**328,600**

A.4.5. Public funding of the project activity:

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The Project does not involve any public funding of Annex I countries.

SECTION B. Application of a baseline and monitoring methodology:

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

Applied baseline and monitoring methodology:

AM0034 Version 02, 1st, November 2006 "Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants"

References to: AM0028 Version 04.1"Catalytic N_2O destruction in the tail gas of nitric acid or caprolactam production plants" and the "Tool for the demonstration and assessment of additionality", Version 4.

The above mentioned Methodologies and tools are available on the following website:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

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According to the applicability conditions of AM0034 (Version 02), the justification of the choice of the methodology for the Project is as follows:

- **The applicability is limited to the existing production capacity measured in tons of nitric acid, where the commercial production started not later than 31st December 2005. Definition of "existing" production capacity is applied for the process with the existing ammonia oxidization reactor where N_2O is generated and not for the process including a new ammonia oxidizer. Existing production "capacity" is defined as the designed capacity, measured in tons of nitric acid per year.**

  The Project will be applied to an existing production facility installed prior to 31st December 2005. The plant has been commissioned and is in operation since 2004. The designed production capacity of this nitric acid plant is 105,120 tons of nitric acid at 100% concentration per year (based on 365 operating days per year and a designed daily capacity of 288 tons of nitric acid at 100% concentration).

- **The project activity will not result in the shut-down of any existing N_2O destruction or abatement facility or equipment at the plant.**

  Currently, the plant does not have any N_2O destruction or abatement facilities or equipment installed that could be effected by the Project activity.

- **The project activity shall not affect the level of nitric acid production.**

  In accordance with the information from the catalyst technology provider, the installation of the secondary catalyst will not have any influence on the plants nitric acid production levels.

- **There are currently no regulatory requirements or incentives to reduce levels of N_2O emissions from nitric acid plants in the host country.**

  Currently, China does not have any regulatory requirements or incentives to reduce levels of N_2O emissions from nitric acid plants.

- **No N_2O abatement technology is currently installed in the plant.**

  There is no N_2O abatement technology installed at the plant.

- **The project activity will not increase NO_X emissions.**

  The N_2O abatement catalyst is highly selective and decomposes N_2O into N_2 and O_2. Therefore, and Project will not cause any increase of NO_X emissions.

- **NO_X abatement catalyst installed, if any, prior to the start of the project activity is not a Non-Selective Catalyst Reduction (NSCR) DeNO_X unit.**

  The NO_x abatement system installed at the plant is a Selective Catalyst Reduction (SCR) unit.

- **Operation of the secondary N_2O abatement catalyst installed under the project activity does not lead to any process emissions of greenhouse gases, directly or indirectly.**

  There will be no additional energy or fuel consumed directly or indirectly related to the installation of the secondary N_2O abatement catalyst. Moreover the Project contains no leakage and will therefore not lead to any process emissions of greenhouse gases, directly or indirectly.

- **Continuous real-time measurement of N_2O concentration and total gas volume flow can be carried out in the stack:**
  - **Prior to the installation of the secondary catalyst for one campaign, and**
  - **After the installation of the secondary catalyst throughout the chosen crediting period of the project activity.**

  For carrying out the Project an additional extension platform will be constructed between the absorber and the stack. This allows for the installation of respective probes and sensors into the stack for continuous measurement of the N_2O concentration and tail gas volume flow, including temperature and pressure of the stack gas, both prior to (Baseline Campaign) and after (Project Campaigns) the installation of the secondary catalyst as required under this condition.

In conclusion, the Project complies will all applicability conditions as outlined in AM0034 (Version 02).

B.3. Description of how the sources and gases included in the project boundary:

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According to AM0034 (Version 02), the spatial extent of the Project shall cover the facilities and equipment for the complete nitric acid production process from the inlet to the ammonia burner to the stack. This includes all compressors, tail gas expander turbines and any NO_X abatement equipment installed. The only greenhouse gas to be included in the project boundary is N_2O which is contained in the tail gas stream exiting the stack.

The nitric acid plant involved in the Project is a high pressure design pressure design. The plant specific flow diagram is shown below in Figure 3. The emission sources included in the project boundary are listed in Table 2 below.

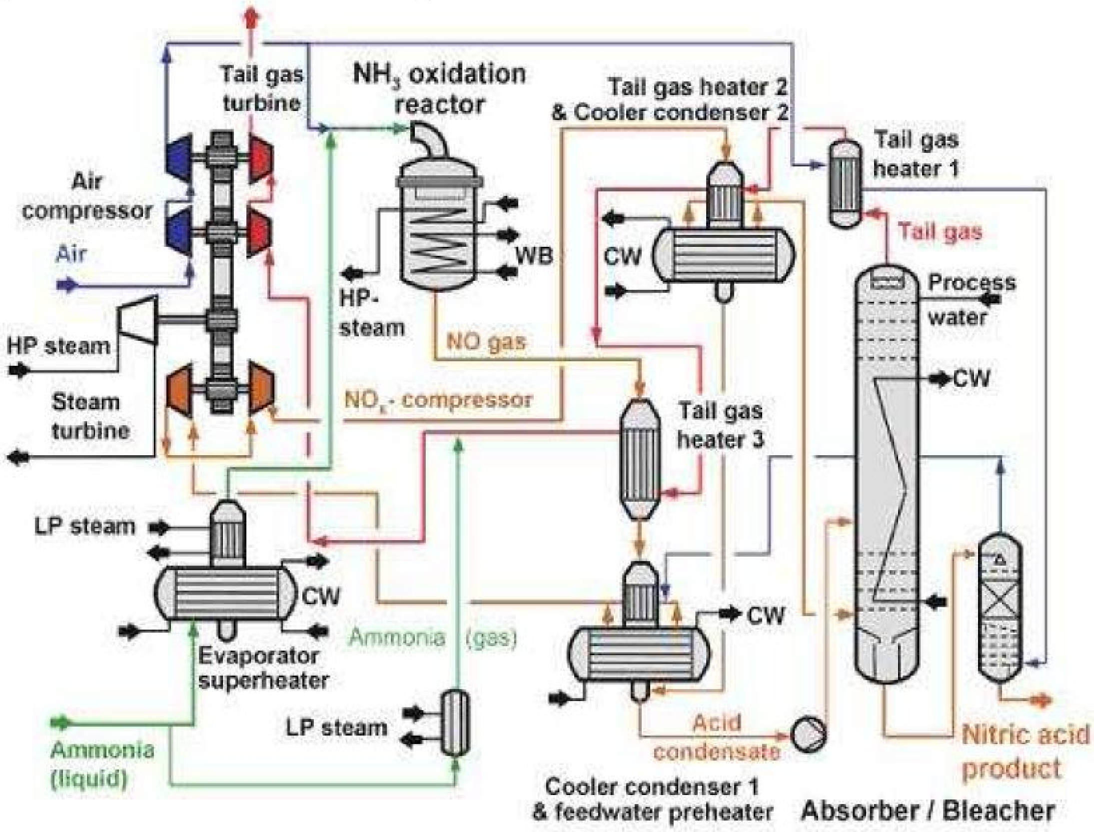

Figure 3: Process flow diagram of the Project plant

Table 2: Overview of emission sources included in or excluded from the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	Nitric Acid Plant (Burner Inlet to Stack)	CO_2	Excluded	The Project does not lead to any change in CO_2 or CH_4 emissions. Therefore these emissions are not included.
		CH_4	Excluded	
		N_2O	Included	Main emission source
Project Activity	Nitric Acid Plant (Burner Inlet to Stack)	CO_2	Excluded	The Project does not lead to any change in CO_2 or CH_4 emissions.
		CH_4	Excluded	
		N_2O	Included	Main emission source
	Leakage emissions from production, transport, operation and decommissioning of the	CO_2	Excluded	No leakage emissions are expected.
		CH_4	Excluded	
		N_2O	Excluded	

	catalyst.				

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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As per AM0034 (Version 02), the baseline scenario shall be identified using procedure for *Identification of the baseline scenario described in the approved methodology AM0028 "Catalytic N_2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants"*.

The identification procedure from step 1 to step 5 is described below:

Step 1: Identify technically feasible baseline scenario alternatives to the project activity:

According to AM0028 Version 04.1, the baseline scenario alternatives should include all technically feasible options which are realistic and credible.

Step 1a: The baseline scenario alternatives should include all possible options that are technically feasible to handle N_2O emissions. These options are, *inter alia*:

1. Status quo: The continuation of the current situation, where there will be no installation of technology for the destruction or abatement of N_2O.
2. Switch to alternative production method not involving ammonia oxidation process.
3. Alternative use of N_2O such as:
   a) Recycling of N_2O as a feedstock for the plant;
   b) The use of N_2O for external purposes.
4. Installation of a Non-Selective Catalytic Reduction (NSCR) $DeNO_X$ unit.
5. The installation of an N_2O destruction or abatement technology:
   a) Tertiary measure for N_2O destruction;
   b) Primary or secondary measure for N_2O destruction or abatement.
6. The Project not undertaken as a CDM project (contained in the above alternative 5b).

Step 1b: In addition to the baseline scenario alternatives of step 1a, all possible options that are technically feasible to handle NO_X emissions should be considered. The installation of a NSCR $DeNO_X$ unit could also cause N_2O emission reduction. Therefore, NO_X emission regulations have to be taken into account in determining the baseline scenario. The respective options are, *inter alia*:

7. The continuation of the current situation, where either a $DeNO_X$-unit is installed or not;
8. Installation of a new Selective Catalytic Reduction (SCR) $DeNO_X$ unit;
9. Installation of a new Non- Selective Catalytic Reduction (NSCR) $DeNO_X$ unit;
10. Installation of a new tertiary measure that combines NO_X and N_2O emission reduction.

Since both alternative 1 and alternative 7 represent the continuation of the current situation, where a SCR $DeNO_x$ unit is installed and no N_2O technology is installed, alternative 7 is actually the same as alternative 1. Meanwhile, alternatives 9 and 4 represent the same scenario. Therefore, alternatives 7 and 9 will not be further considered and discussed in the following steps.

Moreover, since an operational SCR $DeNO_x$ unit is already installed at the plant, alternative 8, installation of a new SCR $DeNO_x$ unit, is not regarded as realistic and credible option and is therefore eliminated from further considerations as well.

Step 2: Eliminate baseline alternatives that do not comply with legal or regulatory requirements:

There are currently no legal or regulatory requirements on N_2O emissions in China and the actual NOx emission level in the Project plant is in compliance with the NOx emission standard as stipulated in the national standard GB16297-1996 *Integrated Emission Standard of Air Pollutants of P. R. China.* Therefore, alternative 1 complies with all legal and regulatory requirements. All the other alternatives also comply with all legal and regulatory requirements since there are no laws and regulations in China which demand the installation of any N_2O or NOx abatement technologies.

In conclusion, none of the identified baseline scenario alternatives could be eliminated in this step.

Step 3: Eliminate baseline scenario alternatives that face prohibitive barriers (barrier analysis):

Sub-step 3a: On the basis of the alternatives that are technically feasible and in compliance with all legal and regulatory requirements, the project participant should establish a complete list of barriers that would prevent alternatives to occur in the absence of CDM.

- Investment barriers
  Alternatives 4, 5, 6, 8 and 10 as described in **step 1** will all involve installation of new equipment which will require a large amount new capital investment. However, none of these alternatives will generate any economic revenues. Therefore the project owner Jihua will have no incentive to invest in these alternatives as all emissions of the nitric acid plant at Jihua are already in compliance with all the relevant regulatory laws. Thus, alternatives 4, 5, 6, 8 and 10 can be eliminated in this step because of the investment barriers.
- Technological barriers
  Alternative 3 will face great technological barriers. Recycling N_2O and feeding it back to the process or the use of N_2O for external purposes not only requires more advanced technology that would need to be imported but also faces the problem of low N_2O concentration in the big volume of tail gas, which makes the efforts practically unfeasible. Therefore alternative 3 is eliminated for further consideration.
- Barriers due to prevailing practice
  Alternative 2 can be eliminated because of the barriers due to prevailing practice. There are currently no other process options for nitric acid production available in China and all nitric acid plants in the Host Country are using the ammonia oxidation process which is thus considered as prevailing practice prohibiting alternative 2 from being implemented.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed CDM project):

All the barriers identified in **step 3a** above would not prevent the implementation of alternative 1, i.e. *Status Quo: The continuation of the current situation*, because this alternative does not need any new capital investment or installation of new technology and it is the common practice in the Host Country.

The discussion above is summarized in the following table.

Baseline scenario alternatives	Exclusion for not complying with legal requirements	Exclusion for identified barriers			Probability
		Investment barriers	Technological barriers	Barriers due to prevailing practice	
1(7)	No	No	No	No	Not excluded
2	No	No	No	Yes	Excluded
3	No	No	Yes	Not applicable	Excluded
4(9)	No	Yes	Not applicable	Not applicable	Excluded
5	No	Yes	Not applicable	Not applicable	Excluded
6	No	Yes	Not applicable	Not applicable	Excluded
8	No	Yes	Not applicable	Not applicable	Excluded
10	No	Yes	Not applicable	Not applicable	Excluded

From the discussion above alternative 1 can clearly be identified as for the most likely baseline scenario. Therefore, it can be concluded that the baseline scenario of the Project is alternative 1, i.e. *Status Quo: The continuation of the current situation*. Thus **step 4, i.e. identify the most economically attractive baseline scenario alternative**, can be skipped.

Step5: Re-assessment of Baseline Scenario in course of proposed project activity's lifetime:

According to AM0034 (Version 02), the project participant will execute a re-assessment of the baseline scenario following the steps as described below in the event of any new or modified NO_X or N_2O emission regulations being introduced.

Sub-step 5a: New or modified NO_X -emission regulations

If new or modified NO_X -emission regulations are introduced after the Project start, determination of the baseline scenario will be re-assessed at the start of a crediting period. Baseline scenario alternatives to be analyzed will include:

- Selective Catalytic Reduction (SCR);
- Non- Selective Catalytic Reduction (NSCR);
- Tertiary measures incorporating a selective catalyst for destroying N_2O and NO_X emissions;
- Continuation of baseline scenario.

For the determination of the adjusted baseline scenario the project participant will re-assess the baseline scenario and will apply the baseline determination process as stipulated above (Steps 1-5).

Sub-step 5b: New or modified N_2O-regulation

If legal regulations on N_2O emissions are introduced or changed during the crediting period, the baseline emissions will be adjusted at the time the legislation has to be legally implemented.

Following the procedure to identify the baseline scenario as described above in Steps 1-5, it can be concluded that the most likely baseline scenario of the Project is the continuation of emitting N_2O to the atmosphere, without the installation of N_2O destruction or abatement technologies, including technologies that indirectly reduce N_2O emissions (e.g. NSCR $DeNO_X$ units).

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

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According to AM0034 (Version 02), the "*Tool for demonstration and assessment of additionality*" Version 4 is used to demonstrate and assess the additionality of the Project.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

As per AM0034 (Version 02), because of the similarity of both approaches used to determine the baseline scenario and the additionality tool, step 1 of the "*Tool for demonstration and assessment of additionality*" is omitted. For the details of the identification of alternatives to the project activity please refer to section B.4.

Step 2: Investment analysis

For demonstrating additionality of the Project, the investment analysis aims to determine whether the Project without the revenues from the sale of certified emission reductions (CERs) is economically less attractive than at least one other alternative identified in step 1.

Sub-step 2a: Determine appropriate analysis method

According to AM0034 (Version 02), since the Project generates no financial or economic benefits other than CDM related income, the simple cost analysis (Option I) is applied.

Sub-step 2b: Option I. Apply simple cost analysis

Costs associated with the Project activity include, among others, costs related to the purchase, installation, operation and maintenance of the Automated Measuring System for the tail gas measurement and costs related to the purchase or lease of the N_2O abatement catalyst. The total cost of the Project in the first crediting period sums up to approximately USD 1 million. However, the Project will not generate any economic benefits other than the CDM related income.

Compared to the alternative 1, the continuation of the current situation, where no technology for the destruction or abatement of N_2O will be installed and no extra costs will be incurred, the Project activity is apparently not financially attractive without the revenue from the sale of CERs.

Outcome of Step 2:

The investment analysis above shows that the Project is not financially attractive without the revenues from the sale of CERs.

Therefore, Step 3 will be omitted.

Step 4: Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

Since there are no relevant regulations for limiting N_2O emissions from nitric acid production facilities or to lower the concentration of N_2O in the tail gas, no nitric acid plants in China voluntarily adopt any measures for N_2O abatement or destruction. All similar project activities occurring in the host country are designed as CDM projects and are either already registered or in the process of applying for registration as a CDM project, which shall not be included in this analysis according to the additionality tool.

Sub-step 4b: discuss any similar options that are occurring:
As discussed in Sub-step 4a, there are no similar project activities occurring in China except for those applying for CDM registration.

In conclusion it can be stated that the proposed Project is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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<u>Baseline Emissions</u>

According to AM0034 (Version 02), the baseline will be established through continuous monitoring of both the N_2O concentration and the gas volume flow of the tail gas exiting the stack of the nitric acid plant for one complete campaign prior to Project implementation. The steps are as follows:

1. Determination of the permitted operating conditions of the nitric acid plant to avoid overestimation of baseline emissions:

According to AM0034 (Version 02), the normal ranges for operating conditions are determined for the following parameters: (i) oxidation temperature; (ii) oxidation pressure; (iii) ammonia gas flow rate, and (iv) air input flow rates. The permitted ranges are established using the procedures described below:

i Oxidation temperature and pressure:

The following process parameters are monitored:

OT_h Oxidation temperature for each hour（℃）
OP_h Oxidation pressure for each hour (Pa)
OT_{normal} Normal range for oxidation temperature（℃）
OP_{normal} Normal range for oxidation pressure (Pa)

The permitted ranges for oxidation temperature and pressure are determined using the historical data for the operating range of temperature and pressure from the previous five campaigns before the baseline campaign. In accordance with AM0034 (Version 02) the permitted range is determined through a statistical analysis of the historical data in which the time series data is interpreted as a sample for a stochastic variable. All data that falls within the upper and lower 2.5% percentiles of the sample distribution is defined as abnormal and is eliminated. The permitted range of operating temperature and pressure has then been assigned as the historical minimum (value of parameter below which 2.5% of the observation lies) and maximum operating conditions (value of parameter exceeded by 2.5% of observation).

ii Ammonia gas flow rates and ammonia to air ratio input into the ammonia oxidation reactor (AOR):

The following parameters are monitored:

AFR	Ammonia gas flow rate to the AOR	(tNH_3/h)
AFR_{max}	Maximum ammonia gas flow rate to the AOR	(tNH_3/h)
AIFR	Ammonia to air ratio	(%)
$AIFR_{max}$	Maximum ammonia to air ratio	(%)

The upper limits for the ammonia flow and the ammonia to air ratio have been determined using the historical maximum operating data for hourly ammonia gas flow and ammonia to air ratio from the previous five campaigns before the baseline campaign.

The determined permitted ranges lie within the specifications of the nitric acid plant.

2. Determination of baseline emission factor: measurement procedure for N_2O concentration and gas volume flow

N_2O concentration and gas volume flow will be monitored by the Automated Measuring System (AMS) throughout one whole campaign when no secondary catalyst is installed (baseline campaign) prior to the project start. The monitoring system will be installed following the European Norm 14181 (2004). The chosen AMS provides separate readings for N_2O concentration and the tail gas volume flow. Continuous measurement (every 2 seconds) is applied to both parameters, which will be displayed and recorded by the Data Acquisition System (DAS). In addition the hourly average value will be calculated automatically. Error readings (e.g. downtime or malfunction) and extreme values will be eliminated from the output data series.
Measurement results can be distorted before and after periods of downtime or malfunction of the AMS and can lead to mavericks. In order to eliminate such extremes and to ensure a conservative approach, the following statistical evaluation will be applied to the complete data series of N_2O concentration as well as to the data series for gas volume flow. The statistical procedure will be applied to data obtained after eliminating data measured for periods where the plant is operated outside the permitted ranges:

a) Calculate the sample mean (x)
b) Calculate the sample standard deviation (s)
c) Calculate the 95% confidence interval (equal to 1.96 times the standard deviation)
d) Eliminate all data that lie outside the 95% confidence interval
e) Calculate the new sample mean from the remaining values (volume of stack gas (VSG) and N_2O concentration of stack gas (NCSG))

The average mass of N_2O emissions per hour is estimated as product of NCSG and VSG. The N_2O emissions per campaign are estimated as the product of N_2O emissions per hour and the total number of complete hours of operation during the respective campaign using the following equation:

$$BE_{BC}=VSG_{BC}*NCSG_{BC}*10^{-9}*OH_{BC} \quad (tN_2O) \qquad \textbf{(1)}$$

The plant specific baseline emissions factor representing the average N_2O emissions per ton of nitric acid over one full campaign is derived by dividing the total mass of N_2O emissions by the total output of 100% concentrated nitric acid for that period. The actual nitric acid production will be monitored by the plants operational staff and calculated to 100% concentration. Output records will be available on a shift and daily basis. Determination of the baseline emission factor also includes the overall uncertainty of the AMS which will be determined, expressing the measurement error as a percentage (UNC). The N_2O

emission factor per ton of nitric acid produced in the baseline period (EF_{BL}) will be reduced by the estimated percentage error as follows:

EF_{BL}= (BE_{BC}/NAP_{BC}) (1-UNC/100) ($tN_2O/tHNO_3$) **(2)**

Where:

Variable	**Definition**
EF_{BL}	Baseline N_2O emission factor ($tN_2O/tHNO_3$)
BE_{BC}	Total N_2O emissions during the baseline campaign (tN_2O)
$NCSG_{BC}$	Mean concentration of N_2O in the stack gas during the baseline campaign (mgN_2O/m^3)
OH_{BC}	Operating hours of the baseline campaign (h)
VSG_{BC}	Mean gas volume flow rate at the stack in the baseline measurement period (m^3/h)
NAP_{BC}	Nitric acid production during the baseline campaign ($tHNO_3$)
UNC	Overall uncertainty of the monitoring system (%), calculated as the combined uncertainty of the applied monitoring equipment

Following the suggestion of AM0034 the resulting EF_{BL} will be used as the baseline emission factor since no national or regional regulations for N_2O emissions exist in China.

Only data recorded during plant operation within the permitted ranges will be used for determining the baseline emission factor as outlined above. If the plant operates outside the permitted ranges of normal operation conditions for more than 50% of the duration of the baseline campaign, the baseline campaign will be considered invalid and another new baseline campaign using the above described procedures will be carried out in order to determine EF_{BL}.

The supplier of the primary catalyst gauzes and gauzes composition used in the baseline campaign will be the same as in the historical campaigns for setting the operating conditions. Furthermore the project owner will keep the same catalyst supplier and composition for future project campaigns. The purchase certificates from the supplier will be provided to the DOE as evidence to ensure that the calculated EF_{BL} is valid for the following calculation procedures.

Campaign length

In order to take into account the variations in campaign length and its influence on N_2O emission levels, the historic campaign lengths and the baseline campaign length are and will be determined and compared to future project campaign lengths. Campaign length is defined as the total number of metric tons of nitric acid at 100% concentration produced with one set of catalyst gauzes.

The average historic campaign length (CL_{normal}) which is defined as the average campaign length of the historic campaigns used to define the normal operating conditions (previous five campaigns prior to the baseline campaign), will be used as a cap on the length of the baseline campaign. Accordingly the baseline campaign length (CL_{BL}) is determined as follows:

If $CL_{BL} \leqslant CL_{normal}$

All N_2O values measured according to the procedure as described above during the baseline campaign can be used for the calculation of EF_{BL}.

If $CL_{BL} > CL_{normal}$

N_2O values that were measured beyond the length of CL_{normal} during the production of the quantity of nitric acid will be eliminated from the calculation of EF_{BL}.

Project Emissions

Over the duration of the project campaigns, N_2O concentration and gas volume flow in the stack of the nitric acid plant will be measured continuously as well as the temperature and pressure of the tail gas flow.

Estimation of campaign-specific project emissions

The AMS will be installed according to the European standard EN 14181 and will provide separate readings for N_2O concentration and the tail gas volume flow. Continuous measurement (every 2 seconds) is applied to both parameters which will be displayed and recorded by the DAS. In addition, the hourly average value will be calculated automatically. Error readings (e.g. downtime or malfunction) and extreme values will be eliminated from the output data series. As next step, the same statistical evaluation that was applied to the baseline data series will be applied to the project data series as well:

a) Calculate the sample mean (x)
b) Calculate the sample standard deviation (s)
c) Calculate the 95% confidence interval (equal to 1.96 times the standard deviation)
d) Eliminate all data that lie outside the 95% confidence interval
e) Calculate the new sample mean from the remaining values

The calculation of the campaign specific project emissions is carried out according to the procedure for calculating the baseline emission as outlined before.

$$PE_n=VSG_n*NCSG_n*10^{-9}*OH_n \quad (tN_2O) \qquad \textbf{(3)}$$

Where:

Variable	**Definition**
VSG_n	Mean gas volume flow rate for the project campaign (m^3/h)
NCSG	Mean concentration of N_2O in the stack gas for the project campaign (mgN_2O/m^3)
PE_n	Total N_2O emissions of the n^{th} project campaign (tN_2O)
OH_n	Is the number of hours of operation in the specific monitoring period (h)

Derivation of a moving average emission factor

In order to take into account possible long-term emissions trends over the duration of the Project and to take a conservative approach, a moving average emission factor will be estimated following the below procedure:

Step1: The campaign specific emissions factor for each campaign during the Project's crediting period will be determined by dividing the total mass of N_2O emissions during that campaign (PE_n) by the total production of 100% concentrated nitric acid during that same campaign (NAP_n). For campaign n, the campaign specific emission factor is:

$$EF_n=PE_n/NAP_n \quad (tN_2O/tHNO_3) \qquad \textbf{(4)}$$

Step2: The estimation of the moving average emissions factor is calculated at the end of each campaign n as follows:

$$EF_{ma,n}=(EF_1+EF_2+\ldots+EF_n) \quad (tN_2O/tHNO_3) \qquad \textbf{(5)}$$

This procedure will be repeated for each campaign such that a moving average, $EF_{ma,n}$, will be established over time, thus becoming more representative and precise with each additional campaign.

To calculate the total emission reductions achieved in a specific campaign the higher of the two values $EF_{ma,n}$ and EF_n will be applied as the relevant emission factor (EF_p) for the particular campaign and being used for calculating respective emission reductions. Thus:

If $EF_{ma,n} > EF_n$ then $EF_p = EF_{ma,n}$
If $EF_{ma,n} < EF_n$ then $EF_p = EF_n$ **(6)**

Where:

Variable	Definition
EF_n	Emission factor calculated for a specific project campaign ($tN_2O/tHNO_3$)
$EF_{ma,n}$	Moving average (ma) emission factor of after n^{th} campaigns, including the current campaign ($tN_2O/tHNO_3$)
n	Number of campaigns to date
EF_p	Emissions factor that will be applied to calculate the emissions reductions from this specific campaign ($tN_2O/tHNO_3$)

<u>Minimum project emissions factor</u>

A campaign-specific emissions factor shall be used in order to cap any potential long-term trend towards decreasing N_2O emissions that may result from a potential built up of a platinum deposits. In accordance with AM0034 (Version 02), the lowest EF_n observed during the first ten campaigns of the crediting period of the Project will be adopted as a minimum emission factor (EF_{min}). If any of the later project campaigns results in an EF_n below EF_{min}, EF_{min} will be used for calculating the emission reductions of that particular campaign instead of the determined EF_n.

Where:

Variable	Definition
EF_{min}	Is equal to the lowest EF_n observed during the first 10 campaigns of the Project crediting period ($tN_2O/tHNO_3$)

Project Campaign Length

a. Longer Project Campaign
If the length of each individual project campaign CL_n is longer than or equal to the average historic campaign length CL_{normal}, then all N_2O values measured during the baseline campaign will be used for the calculation of EF (subject to the elimination of data from the Ammonia/Air analysis, see above).

b. Shorter Project Campaign
If $CL_n < CL_{normal}$, EF_{BL} will be recalculated by eliminating those N_2O values that were obtained during the production of tons of nitric acid beyond CL_n from the calculation of EF_n.

Leakage

According to AM0034 (Version 02), no leakage calculation is required for this project type.

Emission Reductions

The emission reductions for the Project over a specific campaign are determined by deducting the campaign-specific emission factor from the baseline emission factor and multiplying the result by the production output of 100% concentrated nitric acid over the campaign period and the GWP of N_2O:

$$ER = (EF_{BL} - EF_p) * NAP * GWP_{N2O} \quad (t\ CO_2e) \qquad \textbf{(7)}$$

Where:

Variable	**Definition**
ER	Emission reductions of the Project for the specific campaign (t CO_2e)
NAP	Nitric acid production for the project campaign ($tHNO_3$). The maximum value of NAP shall not exceed the design capacity.
EF_{BL}	Baseline emissions factor ($tN_2O/tHNO_3$)
EF_P	Emissions factor used to calculate the emissions from this particular campaign (i.e. the higher of $EF_{ma,n}$ and EF_n)

B.6.2. Data and parameters that are available at validation:

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Verification of the historical process data will not be included in the validation of the Project. Instead all historical data including the catalyst gauze supplier and gauze composition information will be submitted along with the completed baseline data to the respective DOE appointed for initial and baseline verification. Accordingly no Data or parameters are listed within this section.

B.6.3. Ex-ante calculation of emission reductions:

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In order to ex-ante calculate the emission reductions of the project activity, the above outlined steps are carried out using the following parameter values:

The below table summarizes the parameter values being applied to calculate the emission reductions of the project.

	Parameters	Unit	Value applied	Comments
Baseline Emissions	$NCSG_{BC}$	ppm (mg/Nm^3)	2,000 (3,928.57)	Estimate based on rough N_2O measurement
	VSG_{BC}	Nm^3/h	40,000	Estimate based on operation data
	OH_{BC}	h	2,160	Estimate based on historic data analysis
	UNC	%	2	Estimated as to usual AMS error rates
	NAP_{BC}	$tHNO_3$	25,000	Estimate based on historic data analysis

Project Emissions	$NCSG_n$	ppm (mg/Nm^3)	400 (785.71)	Estimate according to secondary catalyst technology providers
	VSG_n	Nm^3/h	40,000	Estimate based on operation data
	OH_n	h	2,160	Estimate based on historic data analysis
	NAP_n	$tHNO_3$	25,000	Estimate based on historic data analysis
Emission Reductions	GWP_{N2O}	--	310	IPCC Second Assessment Report 1995
	NAP	$tHNO_3/yr$	100,000	Estimate based on historic data analysis

Baseline emissions

The baseline will be establish through continuous monitoring of both N_2O concentration and gas flow volume in the stack of the nitric acid plant for one complete campaign prior to project implementation. For the purpose of ex-ante calculation of the baseline emissions, the following steps are used to estimate the baseline N_2O emission factor:

Estimation of the baseline N_2O emissions

According to equation **(1)** from section B.6.1, the baseline emissions can be estimated as following with the values in the above table being applied:

$BE_{BC} = VSG_{BC}*NCSG_{BC}*10^{-9}*OH_{BC} = 40{,}000*3{,}928.57*10^{-9}*2{,}160=\mathbf{339.43}$ (tN_2O)

Estimation of the baseline N_2O emission factor

The baseline emission factor can be calculated as follows by applying the parameter values from the above table to equation **(2)** from section B.6.1:

$EF_{BL}= (BE_{BC}/NAP_{BC})\ (1\text{-}UNC/100) = (339.43/25{,}000)\ (1\text{-}2/100) =\mathbf{0.0133}$ ($tN_2O/tHNO_3$)

Project emissions

Estimation of campaign-specific project emissions

The campaign-specific project N_2O emissions are estimated below by using equation **(3)** from B.6.1:

$PE_n = VSG_n*NCSG_n*10^{-9}*OH_n = 40{,}000*785.71*10^{-9}*2{,}160 = \mathbf{67.89}$ (tN_2O)

Calculation of campaign-specific emission factor

The campaign-specific emission factor is estimated by using equation **(4)** from B.6.1:

$EF_n = PE_n/NAP_n = 67.89/25{,}000 = \mathbf{0.0027}$ ($tN_2O/tHNO_3$)

Derivation of a moving average emission factor

For the purpose of ex-ante estimation of the emission reductions of the Project, as only one exemplary project campaign has been estimated, the moving average emission factor will not be estimated and the campaign-specific emission factor as estimated above will be used for the ex-ante estimation of the emission reductions of the Project.

$EF_p = EF_n =$ **0.0027** $tN_2O/tHNO_3$

Minimum project emission factor

The same argument applies as for the moving average emission factor. As so far only the emission factor for one project campaign has been estimated, this emission factor presents at the same time also the minimum emission factor.

Leakage

According to AM0034, no leakage calculation is required.

Emission reductions

According to equation **(7)** under B.6.1, the emissions reductions of the Project are calculated as follows:

$ER = (EF_{BL} - EF_p)*NAP*GWP_{N2O} = (0.0133-0.0027)*100{,}000*310 =$ **328,600** (t CO_2e)

B.6.4. Summary of the ex-ante estimation of emission reductions:

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Year	Estimation of project activity emissions (tons of CO_2e)	Estimation of baseline emissions (tons of CO_2e)	Estimation of leakage (tons of CO_2e)	Estimation of overall emission reductions (tons of CO_2e)
2008 (Jul.-Dec.)	41,850	206,150	0	164,300
2009	83,700	412,300	0	328,600
2010	83,700	412,300	0	328,600
2011	83,700	412,300	0	328,600
2012	83,700	412,300	0	328,600
2013	83,700	412,300	0	328,600
2014	83,700	412,300	0	328,600
2015 (Jan.-Jun.)	41,850	206,150	0	164,300
Total (tCO_2e)	**585,900**	**2,886,100**	**0**	**2,300,200**

B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1. Data and parameters monitored:

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Baseline emission parameters to be monitored

Data / Parameter:	**B.1/ $NCSG_{BC}$**
Data unit:	mgN_2O/Nm^3
Description:	N_2O concentration in the stack gas during the baseline campaign
Source of data to be used:	ABB Easyline Continuous Gas Analyser: EL3020 Uras 26
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	3,928.57
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB Easyline Continuous Gas Analyser: EL3020 Uras 26]** $NCSG_{BC}$ will be continuously monitored with the N_2O gas analyser throughout the baseline campaign and parameter values will be recorded and stored every two seconds. The monitoring system will provide an hourly value for $NCSG_{BC}$, which represents the average of the measured values for the previous hour. Error readings and extreme values will be eliminated from the output data series. The data will be converted from ppm into mg N_2O/m^3 using the following formula: $NCSG = ppmv * M / v$ (mg N_2O/Nm^3) Where: *ppmv* is the parts per million of volume *M* is the gram molecular weight of N_2O (44 g/mol) *v* is the volume of one mole of an ideal gas (22.4 L/mol) As required by AM0034 (Version 02), hourly means for $NCSG_{BC}$ are derived by the data acquisition system. $NCSG_{BC}$ data taken during times when the plant is operating outside the permitted operating range will be eliminated. The remaining hourly average values are subject to the following statistical analysis: a) Calculate the sample mean (x) b) Calculate the sample standard deviation (s) c) Calculate the 95% confidence interval (equal to 1.96 times the standard deviation) d) Eliminate all data that lie outside the 95% confidence interval e) Calculate the new sample mean from the remaining $NCSG_{BC}$ values
QA/QC procedures to be applied:	Trained operational staff will perform practical daily checks to the gas analyser and the signal to the DAS, and filling out a daily check form.

	A weekly check to the probes in the stack will also be performed by trained staff (visual check up), and every three months the equipment supplier (ABB) will conduct a regular inspection to the gas analyser. The trained staff will follow written procedures on data recording and storage, and report any malfunction or abnormalities of the equipment to the CDM manager and inform the manufacturer for further inspection if necessary. Calibration forms and procedures will be kept in the CDM cabinet for calibration records. All calibration and maintenance work on the N_2O gas analyser will be done by ABB experts only.
Any comment:	The data output from the analyser will be processed using appropriate software and saved in a respective data logger. Hourly average values will be printed out on a regular basis and be transferred into electronic data storage. All data will be archived for at least the entire crediting period.

Data / Parameter:	**B.2/ VSG_{BC}**
Data unit:	Nm^3/h
Description:	Gas volume flow rate of the stack gas during the baseline campaign
Source of data to be used:	Gas volume flow meter [ABB 264DP Pressure transmitter and ABB Sensybar 401]
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	40,000
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB 264DP Pressure transmitter and ABB Sensybar 401]** VSG_{BC} is will be continuously monitored (every 2 seconds) and recorded by the DAS. The monitoring system will provide an hourly value for VSG_{BC}, which represents the average of the measured values for the previous hour. Error readings and extreme values will be eliminated from the output data series. The flow meter measures differential pressure which will be used to calculate the volumetric flow rate (normalised through parallel temperature and pressure measurement). According to AM0034 (Version 02), hourly means for VSG_{BC} are derived by the data acquisition system. VSG_{BC} data taken during times when the plant is operating outside the permitted operating range will be eliminated. The remaining hourly average values are subject to the following statistical analysis: a) Calculate the sample mean (x) b) Calculate the sample standard deviation (s) c) Calculate the 95% confidence interval (equal to 1.96 times the standard deviation)

	d) Eliminate all data that lie outside the 95% confidence interval e) Calculate the new sample mean from the remaining VSG_{BC} values
QA/QC procedures to be applied:	Trained operational staff will perform practical daily checks to the flow meter signal on the DAS, and filling out a daily check form. A weekly check to the tube in the stack will also be performed by trained staff (visual check up), and every three months the equipment supplier (ABB) will conduct a regular inspection to the gas analyser. The trained staff will follow written procedures on data recording and storage, and report any malfunction or abnormalities of the equipment to the CDM manager and inform the manufacturer for further inspection if necessary. Calibration forms and procedures will be kept in the CDM cabinet for calibration records. All calibration and maintenance work will be done by ABB experts only.
Any comment:	The data output from the analyser will be processed using appropriate software and saved in a respective data logger. Hourly average values will be printed out on a regular basis and be transferred into electronic data storage. All data will be archived for at least the entire crediting period.

Data / Parameter:	**B.3/ BE_{BC}**
Data unit:	tN_2O
Description:	Total N_2O emission for baseline campaign
Source of data to be used:	Calculated as described under B.6.1
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	339.43
Description of measurement methods and procedures to be applied:	Detailed in B.6.1
QA/QC procedures to be applied:	Not applicable to calculated values.
Any comment:	The value will be calculated at the end of the baseline campaign by using an excel tool specifically developed for this purpose. Moreover the total amount of N_2O during the baseline campaign will also be manifested in the verification report. Both, electronic and paper records will be archived for at least the entire crediting period.

Data / Parameter:	B.4/ OH_{BC}
Data unit:	hours
Description:	Operating hours of the plant during baseline campaign
Source of data to be used:	Internal CDM form (A1_process data log sheet) which is filled out according to production log.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	2,160
Description of measurement methods and procedures to be applied:	Trained staff will fill out the daily data recording form (A1_process data log sheet) which includes operational hours of the plant per 8 hour shift. The manager of the data recording department will calculate daily operation hours and the actual operation hours for the baseline campaign.
QA/QC procedures to be applied:	The trained staff will carry out the daily recording according to QA procedures and the monitoring plan (MP). The recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week!
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	B.5/ NAP_{BC}
Data unit:	$tHNO_3$
Description:	Nitric acid production (at 100% concentration) over baseline campaign
Source of data to be used:	Internal CDM form (A1_process data log sheet) which is filled out according to production log.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	25,000
Description of measurement methods and procedures to be applied:	The measurement will be carried out by a magnetic nitric acid volume flow meter from ADMAG. The measured volume flow will be calculated into mass in reference to the measured density of nitric acid and converted into 100% concentration (lab analysis). Trained staff will fill out a daily data recording form which includes the tons of nitric acid production (100% concentration) per 8 hour shift. The manager of the data recording department will calculate daily production numbers and the total output of HNO_3 in tons for the entire baseline campaign.
QA/QC procedures to be applied:	The trained staff will carry out the daily recording according to QA procedures and the monitoring plan (MP). The daily check to the nitric acid flow meter will be carried out and the daily check form will be filled out by trained staff from the instrument department according to the respective procedure. The recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic

	data storage will be performed once a week. Calibration of the meter will take place regularly as recommended by meter's manufacturer and will be performed by a qualified institution outside the factory.
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	**B.6/ TSG**
Data unit:	℃
Description:	Temperature of stack gas (during baseline campaign)
Source of data to be used:	Probe [ABB Sensytemp TSP121]
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB Sensytemp TSP121]** The temperature of the existing tail gas will be measured every 2 seconds in order to provide for valid normalization of the volume flow (Nm^3/h). According to AM0034 (Version 02) it is not required to be reported as separate parameter.
QA/QC procedures to be applied:	A daily check to the temperature signal on the DAS will be carried out by trained staff from instrument department. Malfunction or abnormalities will be recorded and reported to the CDM manager. ABB will be informed for further inspection if necessary. All calibration and maintenance work will be done by ABB experts only.
Any comment:	None

Data / Parameter:	**B.7/ PSG**
Data unit:	Pa
Description:	Pressure of stack gas
Source of data to be used:	Probe [ABB 264GP Pressure transmitter]
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB 264GP Pressure transmitter]** The temperature of the existing tail gas will be measured every 2 seconds in order to provide for valid normalization of the volume flow (Nm^3/h). According to AM0034 (Version 02) it is not required to be reported as separate parameter.
QA/QC procedures to be applied:	A daily check to the pressure signal on the DAS will be carried out by trained staff from the instrument department. Malfunction or abnormalities will be recorded and reported to the CDM manager. ABB will be informed for further inspection if necessary. All calibration and

	maintenance work will be done by ABB experts only.
Any comment:	None

Data / Parameter:	**B.8/ EF_{BL}**
Data unit:	$tN_2O/tHNO_3$
Description:	Emission factor for baseline period
Source of data to be used:	Calculated from measured data
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	0.0133
Description of measurement methods and procedures to be applied:	Calculation details are outlined under B.6.1according to AM0034 (Version 02).
QA/QC procedures to be applied:	Not applicable to calculated value.
Any comment:	The value will be calculated at the end of the baseline campaign by using an excel tool specifically developed for this purpose. Moreover the baseline emission factor will also be manifested in the verification report. Both, electronic and paper records will be archived for at least the entire crediting period.

Data / Parameter:	**B.9/ UNC**
Data unit:	%
Description:	Overall measurement uncertainty of the monitoring system
Source of data to be used:	Calculation of the combined uncertainty of the applied monitoring equipment
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	2 (%)
Description of measurement methods and procedures to be applied:	After commissioning of the monitoring system an independent service provider will be contracted to undertake the EN14181 QAL2 test for the monitoring system and the overall uncertainty of the monitoring system will be calculated by the independent service provider.
QA/QC procedures to be applied:	Independent service provider with EN14181 accreditation will be contracted to do the QAL2 test and UNC calculation for the monitoring system.
Any comment:	The original test certificate will be kept. Moreover the calculated value will be used for an excel tool and will also be manifested in the verification report. Both, electronic and paper records will be archived for at least the entire crediting period.

Data / Parameter:	B.10/ AFR
Data unit:	$kgNH_3/h$
Description:	Ammonia gas flow rate to the AOR (during operating condition campaigns and baseline period).
Source of data to be used:	Logbook of previous five historical campaigns from nitric acid plant and internal CDM form (A1_process data log sheet) which will be filled out according to production log during the baseline period.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Monitored continuously by an orifice flow meter (normalized through separate temperature and pressure measurements). The signal for this parameter is part of the local DCS and will be recorded in the production log as well as the internal CDM form "A_ process data log sheet"!
QA/QC procedures to be applied:	Besides the above mentioned log sheet practice the recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week! Calibration will be carried out by certified staff of Jihua on regular basis as required by the manufacturer.
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	B.11/ AFR_{max}
Data unit:	$kgNH_3/h$
Description:	Maximum ammonia gas flow rate to the AOR
Source of data to be used:	Logbook of previous five historical campaigns from nitric acid plant
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The historical maximum from the operating data for hourly ammonia gas flow rate from the previous five campaigns prior to the baseline campaign will be calculated and verified upon initial verification.
QA/QC procedures to be applied:	None
Any comment:	Value will be calculated electronically and be manifested in verification report. Both, electronic and paper records will be archived for at least the entire crediting period.

Data / Parameter:	B.12/ AIFR
Data unit:	%
Description:	Ammonia to air ratio (during operating condition campaigns and baseline period).
Source of data to be used:	Logbook of previous five historical campaigns from nitric acid plant and internal CDM form (A1_process data log sheet) which will be filled out

	according to production log during the baseline period.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The AIFR is obtained as hourly value from the operating condition campaigns (historic campaigns) in order to determine the historical maximum value $AIFR_{max}$. The AIFR will also be monitored during the baseline period. For the measurement of the primary air flow a volume flow meter installed inside the primary air flow pipe before mixing with the ammonia stream will be used. During the baseline the AIFR will be recorded in the production log as well as the internal CDM form "A_ process data log sheet"!
QA/QC procedures to be applied:	Besides the above mentioned log sheet practice the recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week! Calibration will be carried out by certified staff of Jihua on regular basis as required by the manufacturer.
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	**B.13/ CL_{BL}**
Data unit:	$tHNO_3$ at 100% concentration
Description:	Campaign length of baseline campaign
Source of data to be used:	Internal CDM form (A1_process data log sheet) which will be filled out according to production log during the baseline period.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Nitric acid production will be recorded in production log and internal CDM form (A1_process data log sheet) for every shift (8 hours) by trained staff. The manager of the data recording department will calculate daily Nitric Acid production the actual overall production for the baseline campaign.
QA/QC procedures to be applied:	The trained staff will carry out the daily recording according to QA procedures and the monitoring plan (MP). The recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week! Moreover cross checks with sales invoices or other reliable documents specifying this information will be performed.
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	**B.14/ CL_{normal}**
Data unit:	$tHNO_3$
Description:	Normal campaign length = Average historical campaign length during

	operation condition campaigns (past 5 campaigns before baseline period) measured in metric tons of 100% concentrated nitric acid
Source of data to be used:	Logbook of previous five historical campaigns from nitric acid plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Calculated as average campaign length from historic campaigns (the previous five campaigns).
QA/QC procedures to be applied:	None
Any comment:	None

Data / Parameter:	**B.15/ $AIFR_{max}$**
Data unit:	%
Description:	Maximum ammonia to air ratio in ammonia oxidation reactor
Source of data to be used:	Calculated from measured data on AFR and primary air flow rate.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The historical maximum operating data for hourly ammonia to air ratio from the previous five campaigns before the baseline period will be set as $AIFR_{max}$.
QA/QC procedures to be applied:	Determination according to AM0034 (Version 02)!
Any comment:	None

Data / Parameter:	**B.16/ OT_h**
Data unit:	℃
Description:	Oxidation temperature for each hour during the baseline campaign
Source of data to be used:	Thermocouple inside ammonia oxidation reactor (AOR)
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	3 thermal couples with a measuring range from 0~1,100 C° are installed in the AOR right below the primary catalyst for measuring the oxidation temperature.
QA/QC procedures to be applied:	Regular replacement either upon new campaign start or when indicated.
Any comment:	None

Data / Parameter:	**B.17/ OT_{normal}**
Data unit:	℃
Description:	Normal range for oxidation temperature
Source of data to be used:	Logbook of previous five historical campaigns from nitric acid plant

Value of data applied for the purpose of calculating expected emission reductions in section B.6.	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	In accordance with AM0034 (Version 02) the permitted range is determined through a statistical analysis of the historical data in which the time series data is to be interpreted as a sample for a stochastic variable. All data that falls within the upper and lower 2.5% percentiles of the sample distribution is defined as abnormal and will be eliminated. The permitted range of operating temperature is then assigned as the historical minimum (value of parameter below which 2.5% of the observation lie) and maximum operating temperatures (value of parameter exceeded by 2.5% of observation).
QA/QC procedures to be applied:	For applying the statistical analysis to the raw data time series an excel calculation model has been developed to provide sufficient results regarding the huge amount of information.
Any comment:	None

Data / Parameter:	**B.18/ OP_h**
Data unit:	Pa
Description:	Oxidation pressure for each hour during the baseline campaign
Source of data to be used:	Primary air pressure is measured before entering the AOR (and before being mixed with the ammonia stream) by a differential pressure air tube.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	There is no separate meter for measuring the oxidation pressure. Instead the primary air pressure is measured before entering the AOR (and before being mixed with the ammonia stream) by a differential pressure air tube.
QA/QC procedures to be applied:	The trained staff will carry out the daily recording according to QA procedures and the monitoring plan (MP). The recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week! Calibration of the meter will be carried out by certified staff of Jihua on regular basis as required by the manufacturer.
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	B.19/ OP_{normal}
Data unit:	Pa
Description:	Normal oxidation pressure
Source of data to be used:	Logbook of previous five historical campaigns from nitric acid plant
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	In accordance with AM0034 (Version 02) the permitted range is determined through a statistical analysis of the historical data in which the time series data is to be interpreted as a sample for a stochastic variable. All data that falls within the upper and lower 2.5% percentiles of the sample distribution is defined as abnormal and will be eliminated. The permitted range of operating pressure is then assigned as the historical minimum (value of parameter below which 2.5% of the observation lie) and maximum operating pressures (value of parameter exceeded by 2.5% of observation).
QA/QC procedures to be applied:	For applying the statistical analysis to the raw data time series an excel calculation model has been developed to provide sufficient results regarding the huge amount of information.
Any comment:	None

Data / Parameter:	B.20/ GS_{normal}
Data unit:	Name of supplier
Description:	Normal gauze supplier for the operation condition campaigns
Source of data to be used:	Purchase certificates and records for previous five historical campaigns of nitric acid Plant 2 of Jihua (Invoices)
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	-
Description of measurement methods and procedures to be applied:	Actual production information.
QA/QC procedures to be applied:	None
Any comment:	None

Data / Parameter:	B.21/ GS_{BL}
Data unit:	Name of supplier
Description:	Gauze supplier for baseline campaign
Source of data to be used:	Purchase certificates and records from nitric acid plant of Jihua (Invoices)
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement	Purchase certificates and records will be archived.

methods and procedures to be applied:	
QA/QC procedures to be applied:	None
Any comment:	None

Data / Parameter:	**B.22/ $GS_{project}$**
Data unit:	
Description:	Gauze supplier for project campaigns
Source of data to be used:	Purchase certificates and records from nitric acid plant of Jihua (Invoices).
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Purchase certificates and records will be archived.
QA/QC procedures to be applied:	None
Any comment:	None

Data / Parameter:	**B.23/ GC_{normal}**
Data unit:	%
Description:	Gauze composition for the operation condition campaigns
Source of data used:	Product certificates from the gauze supplier
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	Pt: $90 \pm 0.2\%$, Rh: $10 \pm 0.2\%$
Description of measurement methods and procedures to be applied:	Product certificates will be archived.
QA/QC procedures to be applied:	None
Any comment:	None

Data / Parameter:	**B.24/ GC_{BL}**
Data unit:	%
Description:	Gauze composition during baseline campaign
Source of data to be used:	Product certificates from the gauze supplier
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Product certificates will be archived.

QA/QC procedures to be applied:	None
Any comment:	None

Data / Parameter:	**B.25/ $GC_{project}$**
Data unit:	%
Description:	Gauze composition during project campaigns
Source of data to be used:	Product certificates from the gauze supplier
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Purchase certificates and records will be archived.
QA/QC procedures to be applied:	None
Any comment:	None

Data / Parameter:	**B.26/ EF_{reg}**
Data unit:	tN2O/tHNO3
Description:	Emission level set by incoming policies or regulations
Source of data to be used:	Relevant incoming policies or regulations
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Any newly introduced policies or regulations regarding the N_2O emissions at nitric acid plants will be monitored and a corresponding emissions factor will be derived from the regulatory level if applicable.
QA/QC procedures to be applied:	None
Any comment:	The baseline emission factor will be re-adjusted if any regulations limiting N_2O emissions from nitric acid plants come into force in the future. The calculation will follow the procedure as described under B.6.1 in accordance with AM0034 (Version 02).

Project emission parameters to be monitored

Data / Parameter:	**P.1/ NCSG**
Data unit:	mgN_2O/Nm^3
Description:	N_2O concentration in the stack gas during project campaigns
Source of data to be used:	ABB Easyline Continuous Gas Analyser: EL3020 Uras 26
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	785.71
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB Easyline Continuous Gas Analyser: EL3020 Uras 26]** NCSG will be continuously monitored with the N_2O gas analyser throughout every project campaign and the parameter values will be recorded and stored every two seconds. The monitoring system will provide an hourly value for NCSG, which represents the average of the measured values for the previous hour. Error readings and extreme values will be eliminated from the output data series. The data will be converted from ppm into mg N_2O/m^3 using the following formula: NCSG=*ppmv*M/v* (mg N_2O/Nm^3) Where: *ppmv* is the parts per million of volume *M* is the gram molecular weight of N_2O (44 g/mol) *v* is the volume of one mole of an ideal gas (22.4 L/mol) As required by AM0034 (Version 02), hourly means for NCSG are derived by the data acquisition system. NCSG data taken during times when the plant is operating outside the permitted operating range will be eliminated. The remaining hourly average values are subject to the following statistical analysis: f) Calculate the sample mean (x) g) Calculate the sample standard deviation (s) h) Calculate the 95% confidence interval (equal to 1.96 times the standard deviation) i) Eliminate all data that lie outside the 95% confidence interval j) Calculate the new sample mean from the remaining NCSG values
QA/QC procedures to be applied:	Trained operational staff will perform practical daily checks to the gas analyser and the signal to the DAS, and filling out a daily check form. A weekly check to the probes in the stack will also be performed by trained staff (visual check up), and every three months the equipment supplier (ABB) will conduct a regular inspection to the gas analyser. The trained staff will follow written procedures on data recording and storage, and report any malfunction or abnormalities of the equipment to the CDM manager and inform the manufacturer for further inspection if

	necessary. Calibration forms and procedures will be kept in the CDM cabinet for calibration records. All calibration and maintenance work on the N_2O gas analyser will be done by ABB experts only.
Any comment:	The data output from the analyser will be processed using appropriate software and saved in a respective data logger. Hourly average values will be printed out on a regular basis and be transferred into electronic data storage. All data will be archived for at least the entire crediting period.

Data / Parameter:	**P.2/ VSG**
Data unit:	Nm^3/h
Description:	Gas volume flow rate of the stack gas during project campaigns
Source of data to be used:	Gas volume flow meter [ABB 264DP Pressure transmitter and ABB Sensybar 401]
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	40,000
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB 264DP Pressure transmitter and ABB Sensybar 401]** VSG is will be continuously monitored (every 2 seconds) and recorded by the DAS. The monitoring system will provide an hourly value for VSG, which represents the average of the measured values for the previous hour. Error readings and extreme values will be eliminated from the output data series. The flow meter measures differential pressure which will be used to calculate the volumetric flow rate (normalised through parallel temperature and pressure measurement). According to AM0034 (Version 02), hourly means for VSG are derived by the data acquisition system. VSG data taken during times when the plant is operating outside the permitted operating range will be eliminated. The remaining hourly average values are subject to the following statistical analysis: f) Calculate the sample mean (x) g) Calculate the sample standard deviation (s) h) Calculate the 95% confidence interval (equal to 1.96 times the standard deviation) i) Eliminate all data that lie outside the 95% confidence interval j) Calculate the new sample mean from the remaining VSG values
QA/QC procedures to be applied:	Trained operational staff will perform practical daily checks to the flow meter signal on the DAS, and filling out a daily check form. A weekly check to the tube in the stack will also be performed by trained staff

	(visual check up), and every three months the equipment supplier (ABB) will conduct a regular inspection to the gas analyser. The trained staff will follow written procedures on data recording and storage, and report any malfunction or abnormalities of the equipment to the CDM manager and inform the manufacturer for further inspection if necessary. Calibration forms and procedures will be kept in the CDM cabinet for calibration records. All calibration and maintenance work will be done by ABB experts only.
Any comment:	The data output from the analyser will be processed using appropriate software and saved in a respective data logger. Hourly average values will be printed out on a regular basis and be transferred into electronic data storage. All data will be archived for at least the entire crediting period.

Data / Parameter:	**P.3/ PE_n**
Data unit:	tN_2O
Description:	Total N_2O emission for project campaign "n"
Source of data to be used:	Calculated as described under B.6.1
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	67.89
Description of measurement methods and procedures to be applied:	Detailed in B.6.1
QA/QC procedures to be applied:	Not applicable to calculated values.
Any comment:	The value will be calculated at the end of project campaign "n" by using an excel tool specifically developed for this purpose. Moreover the total amount of N_2O during project campaign "n" will also be manifested in a monitoring/verification report. Both, electronic and paper records will be archived for at least the entire crediting period.

Data / Parameter:	**P.4/ OH**
Data unit:	hours
Description:	Operating hours of the plant during project campaigns
Source of data to be used:	Internal CDM form (A1_process data log sheet) which is filled out according to production log.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	2,160
Description of measurement methods and procedures to be applied:	Trained staff will fill out the daily data recording form (A1_process data log sheet) which includes operational hours of the plant per 8 hour shift. The manager of the data recording department will calculate daily operation hours and the actual operation hours for the project campaign.
QA/QC procedures to be	The trained staff will carry out the daily recording according to QA

applied:	procedures and the monitoring plan (MP). The recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week!
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	**P.5/ NAP**
Data unit:	$tHNO_3$
Description:	Nitric acid production (at 100% concentration) over project campaign
Source of data to be used:	Internal CDM form (A1_process data log sheet) which is filled out according to production log.
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	25,000
Description of measurement methods and procedures to be applied:	The measurement will be carried out by a magnetic nitric acid volume flow meter from ADMAG. The measured volume flow will be calculated into mass in reference to the measured density of nitric acid and converted into 100% concentration (lab analysis). Trained staff will fill out a daily data recording form which includes the tons of nitric acid production (100% concentration) per 8 hour shift. The manager of the data recording department will calculate daily production numbers and the total output of HNO_3 in tons for the entire project campaign.
QA/QC procedures to be applied:	The trained staff will carry out the daily recording according to QA procedures and the monitoring plan (MP). The daily check to the nitric acid flow meter will be carried out and the daily check form will be filled out by trained staff from the instrument department according to the respective procedure. The recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week. Calibration of the meter will take place regularly as recommended by meter’s manufacturer and will be performed by a qualified institution outside the factory.
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	**P.6/ TSG**
Data unit:	℃
Description:	Temperature of stack gas (during project campaigns)
Source of data to be used:	Probe [ABB Sensytemp TSP121]
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB Sensytemp TSP121]** The temperature of the existing tail gas will be measured every 2 seconds in order to provide for valid normalization of the volume flow (Nm^3/h). According to AM0034 (Version 02) it is not required to be reported as separate parameter.
QA/QC procedures to be applied:	A daily check to the temperature signal on the DAS will be carried out by trained staff from instrument department. Malfunction or abnormalities will be recorded and reported to the CDM manager. ABB will be informed for further inspection if necessary. All calibration and maintenance work will be done by ABB experts only.
Any comment:	None

Data / Parameter:	**P.7/ PSG**
Data unit:	Pa
Description:	Pressure of stack gas (during project campaigns)
Source of data to be used:	Probe [ABB 264GP Pressure transmitter]
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The equipment to be used for the measurement of the parameter is: **[ABB 264GP Pressure transmitter]** The temperature of the existing tail gas will be measured every 2 seconds in order to provide for valid normalization of the volume flow (Nm^3/h). According to AM0034 (Version 02) it is not required to be reported as separate parameter.
QA/QC procedures to be applied:	A daily check to the pressure signal on the DAS will be carried out by trained staff from the instrument department. Malfunction or abnormalities will be recorded and reported to the CDM manager. ABB will be informed for further inspection if necessary. All calibration and maintenance work will be done by ABB experts only.
Any comment:	None

Data / Parameter:	P.8/ EF_n
Data unit:	$tN_2O/tHNO_3$
Description:	Emission factor for project campaign "n"
Source of data to be used:	Calculated from measured data
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	0.027
Description of measurement methods and procedures to be applied:	Calculation details are outlined under B.6.1according to AM0034 (Version 02).
QA/QC procedures to be applied:	Not applicable to calculated value.
Any comment:	The value will be calculated at the end of project campaign "n" by using an excel tool specifically developed for this purpose. Moreover the emission factor of project campaign "n" will also be manifested in the respective monitoring/verification report. Both, electronic and paper records will be archived for at least the entire crediting period.

Data / Parameter:	P.9 $EF_{ma,n}$
Data unit:	$tN_2O/ tHNO_3$
Description:	Moving average emissions factor derived over time from project campaign specific emission factors.
Source of data to be used:	Calculated from project campaign emissions factors
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Calculation details outlined under B.6.1 according to AM0034 (Version 02).
QA/QC procedures to be applied:	Not applicable to calculated value
Any comment:	None

Data / Parameter:	P.12/CL_n
Data unit:	$tHNO_3$ at 100% concentration
Description:	Campaign length of project campaign "n"
Source of data to be used:	Calculated from nitric acid production data
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	Nitric acid production will be recorded in production log and internal CDM form (A1_process data log sheet) for every shift (8 hours) by trained staff. The manager of the data recording department will calculate daily Nitric Acid production and the actual overall production on 100% for project campaign "n" which equals the respective

	campaign length.
QA/QC procedures to be applied:	The trained staff will carry out the daily recording according to QA procedures and the monitoring plan (MP). The recorded data will be checked by the department manager every day. Regular additional check-ups will be performed by the CDM Manager of the project. Transfer into electronic data storage will be performed once a week! Moreover cross checks with sales invoices or other reliable documents specifying this information will be performed.
Any comment:	All data recording (electronic and paper) will be archived for at least the entire crediting period.

Data / Parameter:	**P.13/EF_p**
Data unit:	$tN_2O/ tHNO_3$
Description:	Emission factor used to determine relevant emission reductions for each project campaign
Source of data to be used:	Calculated from project campaign emissions factors
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	0.0027
Description of measurement methods and procedures to be applied:	Will be determined according to AM0034 (Version 02).
QA/QC procedures to be applied:	Not applicable to the calculated value
Any comment:	None

Data / Parameter:	**P.14/EF_{min}**
Data unit:	$tN_2O/ tHNO_3$
Description:	Minimum emissions factor in the first 10 project campaigns
Source of data to be used:	Determined from project campaign emissions factors
Value of data applied for the purpose of calculating expected emission reductions in section B.6:	This parameter is not used for the calculation of expected emission reductions in section B.6.
Description of measurement methods and procedures to be applied:	The value will be determined after the end of the 10^{th} project campaign based on previous campaign emission factors.
QA/QC procedures to be applied:	Not applicable to the calculated value.
Any comment:	None

B.7.2. Description of the monitoring plan:

>>

The monitoring methodology applied is the approved monitoring methodology AM0034 Version 02, 1st, November, 2006 “Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants”. The Project meets all the applicability requirements for this methodology (as outlined in B.2).

This monitoring methodology requires the collection of historic N_2O emissions baseline data, and the monitoring of ammonia and air input, as well as pressure and temperature inside the ammonia burner during one production campaign of the nitric acid plant, prior to the installation of the N_2O abatement catalyst, as well as the continued monitoring of the N_2O emissions after the installation of the N_2O abatement catalyst.

The Automated Measuring System (AMS) consisting of the following will be used for monitoring:

- An automated extractive gas analyzer system that uses Non Dispersive Infrared Absorption (NDIR) (including probes, pipes and sample conditioning system) that will continuously measure the concentration of N_2O in the stack gas of the nitric acid plant. A probe extracts the homogenously mixed gas directly from the stack or tail gas stream form the point at which it is pumped through gas lines to the analyzer, and
- A gas volume flow meter that uses pressure-differential technique to continuously monitor the gas volume flow, temperature and pressure, in the stack of the nitric acid plant.

Temperature and pressure in the stack will also be measured continuously and used to calculate the gas volume flow at the prescribed temperature and pressure. This calculation of gas volume flow at standard conditions will be carried out automatically by the AMS.

In addition, the total production of nitric acid and the number of operating hours will be recorded.
A plant specific emissions factor will be calculated from the monitored data, both during the baseline period and for each production campaign of the project activity. Statistical evaluation will be applied in order to eliminate distortions in these emissions factors.

For details of the monitoring procedures within the Project see Annex 4.

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity (ies)

>>

Data of completion: 18th, January 2008

Development of baseline study and monitoring methodology:

Organization:	Beijing Changjia Investment Co., Ltd.
Street/P.O. Box:	
Building:	Rm.2504, Building G, Huiyuan International Plaza, Chaoyang District
City:	Beijing
State/Region:	
Postfix/ZIP:	100101
Country:	P. R. China
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FAX:	+86-10-64991543
E-Mail:	
URL:	
Responsible Person	Mr. Wang Donglei
Title:	Director
Salutation:	Mr.
Last Name:	Wang
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Mobile:	+86-13501055687
Direct FAX:	+86-10-64991543
Direct Tel:	+86-10-84977995
Personal E-Mail:	wangdonglei@263.net

SECTION C. Duration of the project activity / Crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
01/08/2007, when equipment purchase agreement was signed for the Project. The baseline campaign of the Project is expected to start in March 2008.

C.1.2. Expected operational lifetime of the project activity:

>>
21 years

C.2. Choice of the crediting period and related information:

C.2.1. Renewable crediting period

>>

C.2.1.1. Starting date of the first crediting period:

>>
01/07/2008

C.2.1.2. Length of the first crediting period:

>>
7 years

C.2.2. Fixed crediting period:

>>

C.2.2.1. Starting date:

>>
Not applicable.

C.2.2.2. Length:

>>
Not applicable.

SECTION D. Environmental impacts

D.1. Documentation on the analysis of the environmental impacts, including trans-boundary impacts:

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According to the Environmental Impact Assessment Law of China, an environmental impact registration form needs to be filled out and submitted to the local environmental authority for approval for projects with insignificant environmental impacts. Since the environmental impacts of the proposed Project are considered to be insignificant according to the *Classified Management Catalogue for Environmental Protection of Construction Projects*, an environmental impact registration form has been filled in and submitted to the local environmental protection bureau for approval.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

This is not applicable to the Project because the environmental impacts are considered to be insignificant according to the relevant regulation in the host party.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

During November 2007, comments of the local stakeholders were collected by the Project owner in the form of a questionnaire. The questionnaire form contains the following sections:

1. Background of the Project
2. Basic information of the respondents
3. Questions to be answered
   (1) What impacts do you think the implementation of the Project will bring up to the environment?
   (2) What impacts do you think the Project will bring up to the local economy?
   (3) How do you think of the impacts the Project will bring up to the local employment?
   (4) What social impacts do you think the Project will bring up?
   (5) What impacts will the Project bring up to your daily life?
   (6) What is your attitude towards the implementation of the Project?
   (7) What other comments do you have regarding the Project? (if any, please detail)

Each question except question (7) is provided with three options, i.e., negative, positive or neutral. If negative answers are selected, respondents are requested to give further explanation on why they choose so.

E.2. Summary of the comments received:

>>

The investigation had 100% response rate and summary of comments are shown below:

(1) All the 28 stakeholders believe that the Project will bring up positive impacts on the environment.
(2) All the 28 stakeholders believe that the Project will promote the local economic development.
(3) 26 stakeholders think that the Project will improve the local employment situations; only 2 of them keep the opinions that there will be no impacts from the Project to the local employment.
(4) All the 28 stakeholders believe that the Project will promote the local social development.
(5) 27 stakeholders think that the Project will improve their daily lives; only 1 of the respondents thinks there will be no impact.
(6) All the 28 stakeholders are supportive to the implementation of the Project.
(7) No further comments from stakeholders were received.

In conclusion, the summary of the survey indicates that all stakeholders reviewed support the implementation of the Project.

The received survey forms are available from the Project owner.

E.3. Report on how due account was taken of any comments received:

>>

Since the overall comments on the Project are positive, no action or any changes to the project will have to be considered in the implementation of the proposed project activity.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Jinan Chemical Fertilizer Co., Ltd.
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

>>
The project will not receive any public funding.

Annex 3

BASELINE INFORMATION

>>
The baseline information will be available after validation and will be submitted to the verification DOE for auditing.

Annex 4

MONITORING PLAN

>>

The developed monitoring plan contains four sections:

1. Data to be monitored and how the data are to be monitored/calculated/estimated;
2. Equipment to be used for monitoring and the related parameters;
3. Quality Assurance System;
4. General management structure.

The data needed for the calculation of the emission reductions achieved by the Project will be monitored using the approved monitoring methodology AM0034 (Version 02) “Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants”.

According to the approved monitoring methodology AM0034 (Version 02), the monitoring system will cover the baseline emissions and project emissions. The monitoring plan details the actions that are necessary for recording all parameters required by AM0034 (Version 02). All data will be archived electronically and/or in hard copy in line with AM0034 (Version 02), and data will be kept for the full crediting period and two years after.

1. Data to be monitored and how the data are to be monitored/calculated/estimated

The monitoring methodology AM0034 (Version 02) requires the collection of historic N_2O emissions baseline data, and the monitoring of ammonia and air input, as well as pressure and temperature inside the ammonia burner during one production campaign of the nitric acid plant, prior to the installation of the N_2O abatement catalyst, as well as the continued monitoring of the N_2O emissions after the installation of the N_2O abatement catalyst.

The Automated Measuring System (AMS) consisting of the following will be used for monitoring:

- An automated extractive gas analyzer system that uses Non Dispersive Infrared Absorption (NDIR) (including probes, pipes and sample conditioning system) that will continuously measure the concentration of N_2O in the stack gas of the nitric acid plant. A probe extracts the homogenously mixed gas directly from the stack or tail gas stream form the point at which it is pumped through gas lines to the analyzer, and
- A gas volume flow meter that uses pressure-differential technique to continuously monitor the gas volume flow, temperature and pressure, in the stack of the nitric acid plant.

Temperature and pressure in the stack will also be measured continuously and used to calculate the gas volume flow at the prescribed temperature and pressure. This calculation of gas volume flow at standard conditions will be carried out automatically by the AMS.

In addition, the total production of nitric acid and the number of operating hours will be recorded.

A plant specific emissions factor will be calculated from the monitored data, both during the baseline period and for each production campaign of the project activity. Statistical evaluation as outlined in section B.6 of the PDD will be applied in order to eliminate distortions in these emissions factors.

Details information regarding the parameters to be monitored is included in section B.7.1 of the PDD.

2. Equipment to be used for monitoring and the related parameters

All the tail gas monitoring equipment will be provided by ABB who was chosen as technology supplier in respect to technological advancement. The equipment itself and its installation will both comply with the European Norm EN14181: assurance of automated measuring systems, 2004.

The following equipment parts are planned to be installed at nitric acid plant 2 of Jihua under ABBs supervision in order to provide for sufficient and accurate monitoring of all required parameters in accordance with AM0034 (Version 02). The equipment maybe adjusted for future requirements as needed and in accordance with AM0034 (Version 02).

Analyzer System Components

1. ***Sample Probe***
2. ***Heated Sample Line***
3. ***Analyzer Cabinet***

   The analyzer cabinet is composed of stainless steel and contains 1) the sample gas pump, filtering and conditioning system, 2) zero and calibration gases, 3) N2O analyzer, and 4) PLC system for data and maintenance monitoring.

   N2O Analyzer, ABB Easyline Continuous Gas Analyzer Type: EL3020 Uras 26The technology employed is a non-dispersive infrared absorption photometer for measuring N2O in tail gas, certified to EN14181 and with the below characteristics:

Infrared Photometer Uras26

Measurement Principle

Non-dispersive infrared absorption in the λ = 2.5–8 µm wavelength range

Photometer to measure up to 4 components with 1 or 2 beam paths and 1 or 2 receivers per beam path in one gas path or two separate gas paths.

Sample Components and Measurement Ranges

The analyzer has one physical measurement range per sample component. The smallest measurement ranges are shown in the following table.

Sample Component	Smallest Measurement Range
CO	0–100 ppm
CO_2	0–100 ppm
NO	0–150 ppm
SO_2	0–100 ppm
N_2O	0–100 ppm
CH_4	0–100 ppm

Measurement Range Limits
0–500 (NO: 750) / 1000 / 3000 ppm, 0–1 / 3 / 10 / 30 / 100 Vol.-%
The measurement ranges are freely adjustable within a range ratio of max. 1:5. An individual measurement range can be factory-set on request. Measurement ranges should not be set within ignition limits.

Stability

The following data apply only if all influence factors (e.g. flow rate, temperature, atmospheric pressure) are constant.

Linearity Deviation
≤ 1 % of span

Repeatability
≤ 0.5 % of span

Zero Drift
≤ 1 % of span per week

Sensitivity Drift
≤ 1 % of measured value per week

Output Fluctuation (2 σ)
≤ 0.2 % of span at electronic T90 time (static / dynamic) = 5 / 0 sec

Detection Limit (4 σ)
≤ 0.4 % of span at electronic T90 time (static / dynamic) = 5 / 0 sec

The Analyzers original measurement range is 0-3000 ppm of nitrogen dioxide (N2O). After the baseline campaign is finalized and after the secondary catalyst has been installed a new Analyzer module will be installed providing a range of 0-400 ppm N2O.

The Analyzer is fitted with integral validation/calibration check cell. Validation is automatic and will be controlled by the data logging system. Validation will be carried out every day and the data logger will record results. Calibration will be by ABB service team with routine gas check for QEL3 certification of the system.

Field Mounted Instruments

4. ***ABB Gas Temperature Transmitter, Type: ABB Sensytemp TSP121ABB***
5. ***Tail Gas Pressure Transmitter, Type: ABB 264GP Pressure transmitter***
6. ***Tail Gas Flow Meter including Sensybar Pieto tube Type: ABB 264DP and Pressure Transmitter Type: ABB Sensybar 401***

Data Logger System Components

7. ***DEMS Cabinet, Type: ABB Steel Data Logger Cabinet***
8. ***Data Logging and Emissions System, Type: Durag D-EMS 2000***

   Emissions evaluation in accordance with European directive 2001/76/EC and 2000/80/EC. The DMS 2000 system can be freely configured according to the needs of the plant and the wishes of the operator. The system allows for multiple backup and continuous data storage, and printing.

Process data is recorded manually at the nitric acid plant. These include Nitric acid flow, ammonia flow rate, ammonia to air ratio, and the temperature and pressure inside the ammonia burner will be measured by existing instruments installed at the Project plant.

3. Quality Assurance System and Monitoring Management System

The Quality Assurance System (QAS) and Monitoring Management System (MMS) will be conducted to the monitoring plan to ensure the results from both the baseline campaign and the project campaigns are reliable and transparent. The QAS contains the following sections: Management Structure, Regular Staff Training, Guidelines and Procedures, and Documentation. The full QAS and MMS, including data and documents from project operation, will be open for review to the DEOs contracted for validation and verification.

- ✓ Management Structure
  There are two main branches of the CDM team, the Instrument Department and the Data Recording Department. The management structure consists of four levels to guarantee a step by step management of the Project which will cast concrete responsibilities on the appointed person who will be actually in charge of a specific task. The four levels refer to the Project Manager, the CDM Project Manager, the Department Managers and the Operators. The nitric acid plant of Jihua provides four shift teams to cover three shifts per day. There are three people within each team, two from the Data Recording Department and one from the Instrument Department. For more details and the diagram on the management structure please see section 4 below.

- ✓ Regular Staff Training
  The QAS/MMS is implemented and will be maintained by expert consultants (G&H). In order to qualify local operational staff to carry out required regular tasks the QAS/MMS consultants provide professional training, both in class and practical application, to the designated CDM team staff before the start of the baseline campaign and ongoing regular training at least once a year for the duration of the project. Only trained staff will be members of the CDM team and only trained CDM staff members will be allowed to perform any tasks related to the implemented CDM project. By this it will be ensured that operational CDM staffs are qualified to carry out the relevant inspections and reports work correctly.

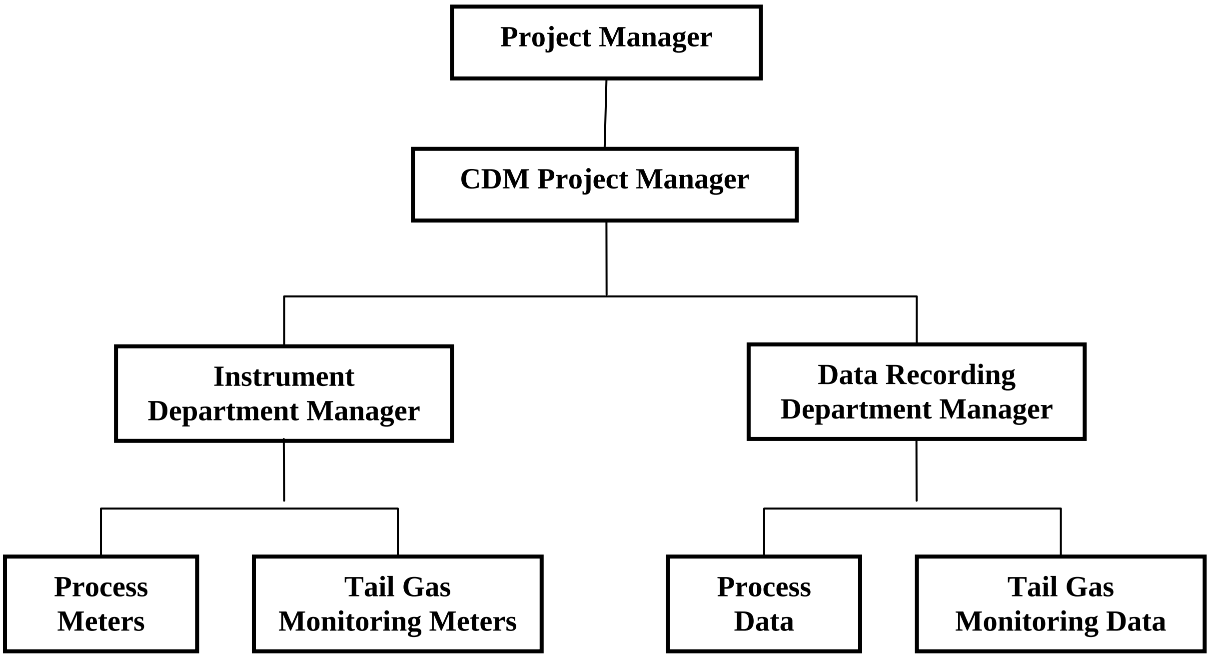
- ✓ Guidelines and Procedures
  The introduced QAS/MMS is building on written guidelines and procedures provided to the operational CDM team staff of both departments and to the local CDM management. The procedures have been developed by the consultants (G&H) according to the requirements of AM0034 (Version 02) and the respective monitoring methodology as well as in cooperation with the tail gas monitoring equipment provider, and existing procedures at the nitric acid plant. All tasks under the monitoring plan will be carried out strictly according to the provided guidelines and procedures.

- ✓ Documentation
  The QAS/MMS documentation is designed to enable CDM staff members from both the Instrument Department and Data Recording Department to performing the required tasks following the given guidelines and procedures. Providing documentation designed specifically for the required tasks according to AM0034 (Version 02) will strongly benefit availability and transparency of data streams and processes which are relevant for the CDM project.

The CDM Project Manager, the Department Managers will carry out the weekly performance and data cross-checking, to ensure that staff are following the QAS/MMS . All documents filled out and data acquired during baseline campaign and project campaigns will be archived separately in two locations for backup.

4. General management structure

The Project owner has designated a CDM team to be responsible for carrying out all relevant tasks related to the Project. Both management people and technical workers will be present in the CDM team. All members of the team must have passed various internal and external training, as required by the plant, for qualification. The below management structure will be applied to the Project in order to allow for best possible performance of the appointed tasks. The team will provide four shift to cover the three shifts operation per day. There are three people within each shift, two from the Data Recording Department and one from Instrument Department. The management structure of the team is shown in the below diagram.


Project Manager
CDM Project Manager
Instrument Department Manager
Data Recording Department Manager
Process Meters
Tail Gas Monitoring Meters
Process Data
Tail Gas Monitoring Data

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