CDM: Proposed new methodology expert form (version 04)

(To be used by methodology experts providing desk review for a proposed new methodology)

Name of expert responsible for completing and submitting this form	Urs Brodmann
Related F-CDM-NM document ID number	NM0126

Note to those completing this form, as applicable: Please provide recommendations on the proposed new baseline and monitoring methodologies based on an assessment of CDM-NMB and CDM-NMM and of their application in sections A to E of the draft CDM-PDD, desk reviews and public input. Please ensure that the form is entirely filled and that arguments and expert judgements are substantiated.

A. Evaluation of the proposed new methodologies by desk reviewers:

I. Evaluation of the porposed new baseline methodology:

Title of new baseline methodology:>>
Measurement of the abatement nitrous oxide (N2O gas) from a nitric acid plant

Note: The proposed methodology is largely copy-pasted from NM0117. *Text in italics* below denotes quotes from the desk review of NM0117 by U. Brodmann.

i. Conditions under which this methodology is applicable to other potential projects (e.g. project type, region, data availability):

>>*The methodology is applicable across regions for projects which reduce N2O emissions at existing nitric acid plants through catalysts placed anywhere between the platinum gauzes of the ammonia burner and the inlet of the absorption tower ("secondary approaches"). The methodology is not applicable to activities which prevent N2O formation in the ammonia burner ("primary approaches"), or destruct N2O in the tail gas ("tertiary approaches").*

The conditions specified in NMB Section A.3 apply, but should be modified as follows:
– "4. The project activity (...) will not lead to an increase in any other GREENHOUSE gases present in the waste gas stream."
– Condition 5 in A.3 should be deleted

The methodology should be restricted to existing nitric acid production capacity. It should not be applicable to new plants, nor to capacity expansions at existing plants, due to the following reasons:
– In the case of new nitric acid production lines, the methodology does not provide sufficient guidance for defining the baseline scenario with respect to production technology.
– Applicability to new capacity could result in a shift of nitric acid production from Annex 1 to non-Annex 1 countries, due to the relevant impact of CERs on overall revenues.

ii. Strengths and weaknesses of the methodology:

>>

The main approach of the methodology is to determine the baseline emissions rate (in t N2O/m3 stack gas) ex ante, through analysis of the stack gas in a 4 week base period prior to installation of the N2O destruction facility. This approach has strengths and weaknesses.

Strengths:
– Avoids the problems of NM0117 regarding stability of N2O, and regarding gaming of baseline during crediting period.

Weaknesses:
– Selection of a representative and conservative base period is critical. The proposed 4-week base period is not sufficiently justified;
– Risk of gaming of the baseline emissions rate by changing operational parameters (e.g. type of platinum gauzes, plant load, pressure, temperature) for maximum N2O formation;
– The approach provides a static picture of the baseline N2O emission rate which does not account for possible future decreases due to technological progress (improved platinum gauzes), and due to increased deposition of platinum downstream of the ammonia burner.

iii. Any changes needed to improve the methodology:

a. Minor changes:>>

1) Improve the description of the methodology:

– D.2 and D.6: Define more clearly the parameters to be determined ex ante through measurement in the base period. What is the unit of the emission parameters, t N2O /m3 stack gas, or ppmv N2O? How are ppmv converted to t N2O /m3?

– B and D.6: Clearly distinguish baseline parameters defined ex ante (baseline emissions rate) vs. those defined ex post (absolute baseline emission).

– Delete reference to ammonia consumption in Section D.6 and D.7.

– All formulas should be numbered.

2) D.6-9: Improve nomenclature of parameters, which is flawed, inconsistent and unnecessarily complex. In particular:

– Use different identifiers for N2O concentration (N2O_co_STG) in the baseline (defined ex ante) and in the project activity scenario;

– Subscripts "_p" ("period"), "_m" ("monitored"?), PISCDF etc. are not applied consistently and should generally omitted where possible;

– Remove redundant parts of Section D.6 relating to Q_N2O_STG_PISCDF_m_p;

– Define parameter M_h: Operation of what? Destruction facility or overall plant?

– The formulas for calculation of N2O mass flows are misleading, because they imply that mass flows for a year (or some other period) may be calculated by multiplying the average stack gas volume flow rate with the average N2O concentration and the operation time of the destruction facility in that period. However, this would not be mathematically correct. Instead, annual mass flows must be calculated by summation of the mass flows in each monitoring interval of the online analyzer, which could be e.g. every 5 minutes.

3) *Regarding additionality test (Section D.3):*
– The methodology should refer to the relevant sections of the additionality tool, rather than reproducing whole sections.
– The role of national or sectoral policies and regulations for control of NOx emissions should be addressed in more detail. Ensure that the selected baseline scenario complies with existing NOx regulation. In cases where new NOx regulation is introduced after the project start, it should only be accounted for once the baseline is re-validated. Revision of the baseline during the crediting period for NOx policies should not be required.

4) The description of the leakage section should be improved (Section D.8):
– Explain the term "utility usage", distinguishing fuels, electricity and reducing agents;
– Delete unnecessary leakage terms in formulas of Section D.9

b. Major changes:>>

– The base period for determining the baseline emissions rate (currently 4 weeks prior to implementation of the N2O destruction facility) must be justified in detail, taking into account the need to be representative and conservative.

– Gaming of the baseline emissions rate during the base period must be avoided. To this end, all parameters through which the plant operator can maximize the N2O emissions rate in the base period must be controlled. Key parameters influencing the N2O emissions rate include, but may not be limited to: Type of gauzes (catalyst); Plant load factor; Temperature; Pressure. These parameters must be monitored during the base period, and shown to be consistent with earlier (historic) data.

– The baseline emissions rate should account for technological progress in the absence of the CDM project activity, i.e. for improvements in catalyst gauzes resulting in increased NO yields and reduced N2O emissions.

– The baseline emissions rate should account for continued deposition of platinum downstream of the ammonia burner, and for how this would influence N2O emissions in the baseline.

– During the crediting period, the specific volume of stack gas (in m3 per t of nitric acid) must be monitored and compared with values from the base period and historic values, in order to avoid inflation of the baseline through increases in specific volume of stack gas. In case the specific gas volume in the crediting period deviates from that in the base period, the ex post calculation of absolute baseline emissions must be adjusted. Provide formula for this purpose.

II. Evaluation of the proposed new monitoring methodology:

Title of new monitoring methodology: >>
Measurement of the abatement nitrous oxide (N2O gas) from a nitric acid plant

i. Conditions under which this methodology is applicable to other potential projects (e.g. project type, region, data availability):

>> Applicable to other projects for secondary destruction of N2O in existing nitric acid plants. Not applicable to project activities in new nitric acid plants. Not applicable to primary and tertiary approaches for N2O abatement.

ii. Strengths and weaknesses of the methodology:

>> No particular strengths and weaknesses identified.

iii. Any changes needed to improve the methodology:

a. Minor changes:>>

– B.1: Delete the sentence: "Emissions from the downtime of the destruction facility are neither claimed for baseline emissions nor for project emissions (outside of the project boundary)."

– B.1: Flow rate (Q_STG) in the base period is not relevant for determining the baseline emissions rate (N2O_co_STG). However, Q_STG must be monitored both in the base period and the crediting period as a basis for calculating the specific volume of stack gas per tonne of nitric acid.

– B.2.1 and B.2.3: Use different identifiers for N2O concentration (N2O_co_STG) in the baseline (defined ex ante) and in the project activity scenario.

– B.2.3: Absolute baseline emissions must be calculated based on the monitored flow of stack gas during the crediting period. Therefore, Parameter B1 (Q_STG) must be the flow of stack gas after (not before) installation of the destruction facility.

– All sections: Improve description of methodology as requested for NMB, especially: Improve nomenclature; define operation hours M_h (operation of what?); eliminate redundancies in B.2.4.

– B.7: Indicate QA/QC procedures for relevant operational parameters such as specific volume of stack gas, plant load, pressure, temperature.

– Specify minimum frequency for sampling and analysis of stack gas.

b. Major changes:>>

– During the 4-week base period (determination of the baseline emissions rate), provide for the monitoring of all parameters which can influence the N2O emissions rate, such as: Type of catalyst (gauzes), plant load, pressure, temperature. Provide for comparison of these values with historic data to ensure that the baseline emissions rate is not inflated.

– Provide for monitoring of specific stack gas volume (m3 gas /t product) during the base period and the crediting period, in line with requests for NMB.

B. Details of the evaluation of the proposed new methodology by the desk reviewer:

I. Proposed new baseline methodology *(specify title here):* >>
Measurement of the abatement nitrous oxide (N2O gas) from a nitric acid plant

(1) Short description of the methodology, including an assessment of which approach from paragraph 48 of the CDM modalities and procedures was used:

a) Describe the methodology:

>> *The proposed project activity aims at reducing nitrous oxide (N2O) emissions at a nitric acid plant. Production of nitric acid typically involves three main steps:*

1) Oxidation of ammonia (NH3) with oxygen (O2) to produce nitric oxide (NO)
2) Oxidation of NO with O2 to produce nitrogen dioxide (NO2)
3) Reacting NO2 with water ("absorption) to produce nitric acid (HNO3)

N2O is formed as an unintended by-product of step 1. A part of the N2O typically decomposes in the subsequent process steps, and the rest is emitted to the atmosphere with the stack gas.

The proposed methodology is intended for project activities which aim at destructing N2O in the reactor gas of nitric acid plants by installing a special catalyst anywhere between the platinum gauzes of the ammonia burner and the entry of the absorption tower (="secondary" approach for N2O destruction). The catalyst decomposes N2O into N2 and O2. In the underlying project activity, the catalyst is placed in the ammonia burner, immediately after the platinum gauzes.

The methodology determines the baseline emissions rate (in t N2O/m3 stack gas) ex ante, based on measurements undertaken in a 4 week base period prior to installation of the N2O destruction facility. The absolute baseline emissions are quantified ex post, by multiplying the baseline emissions rate with the monitored volume of stack gas.

Project emissions are determined based on the monitored volume and N2O content of the stack gas. Operation of the destruction facility is assumed not to result in any other emissions (e.g., no consumption of fuels, electricity, or reducing agents).
Emission reductions are calculated as the difference between the baseline and project emissions. No leakage of emissions outside the project boundary is expected.

b) State the approach selected:
>>*48.a), existing actual or historical emissions*

c) Indicate (in summary form) why the approach selected is the most appropriate. Please provide your expert judgement on the appropriateness of the selected approach to the project category:
>> For existing nitric acid plants, 48.a is appropriate because the existing situation in a plant will usually provide the best starting point for the selection of the baseline scenario, due to lack of incentives for N2O abatement other than CDM. However, the role of technological progress (improvement in platinum gauzes) and operational parameters (e.g., deposition of platinum downstream of ammonia burner) must be accounted for.

For activities in new nitric plants, 48.a would not be appropriate because CDM could have a relevant impact on the investment decision (choice of technology to be installed).

(2) Basis for determining the baseline scenario:

a) State whether the documentation explains how the baseline scenario is to be chosen and identified:
>>*The methodology does not involve a proper selection of a "most likely" baseline scenario from a range of possible scenarios. Rather, the "existing technology" (without any N2O abatement) seems effectively pre-defined as the baseline scenario.*

b) State the basic underlying rationale for algorithms/formulae used (e.g. marginal vs. average basis) (see also section 4 below):
>>
The key assumption is that a representative and conservative baseline emission rate (in t N2O /m3 stack

gas) can be determined by measurement in a base period prior to installation of the N2O destruction facility.

c) State whether the documentation explains how, through the use of the methodology, it can be demonstrated that a project activity is additional and therefore not the baseline scenario. If so, what are the tools provided by the project participants?

>>*The methodology (Section D.3) provides an additionality test which heavily draws on the tool adopted by EB 16.* See Review of NM0117 for details.

d) State whether the basis for determining the baseline scenario and for assessing additionality is appropriate and adequate:

>>

BASELINE SCENARIO

The approach for selecting the baseline scenario is appropriate for existing nitric acid plants, but not for new plants. See review of NM0117 for details.

ADDITIONALITY

The basis for assessing the additionality of the project activity is adequate in principle. Some minor points to consider include the following:

1) The methodology should refer to the relevant sections of the additionality tool, rather than reproducing whole sections (in line with report of EB 18, §20).

2) The role of national or sectoral policies and regulations for control of NOx emissions should be addressed in more detail. Key technologies to control NOx emissions from nitric acid plants include SCR, NSCR, and increased absorption. NSCR has the co-benefit of largely eliminating N2O in addition to NOx. Consequently, regulation of NOx can have an impact on the baseline for N2O in cases where NSCR is the most attractive technology for NOx control. Hence, the methodology should provide for the following:

– Ensure that the selected baseline scenario complies with existing NOx regulation. This may be done by requiring identification and assessment of "lawful alternatives" with respect to NOx, in accordance with Step 1 of the EB Additionality Tool.

– In cases where new NOx regulation is introduced after the project start, it should only be accounted for once the baseline is re-validated. Revision of the baseline during the crediting period for NOx policies (as required in case of new N2O regulation) would seem excessively strict, given that not all NOx control technologies also reduce N2O emissions.

(3) Assessment of the description of the proposed methodology and its applicability

a) State whether the methodology has been described in an adequate manner:

>>

The description is generally of poor quality, full of errors and relics from earlier versions, and not reader-friendly. Some major points to improve:

– D.2 and D.6: Define more clearly the parameters to be determined ex ante through measurement in the base period. What is the unit of the emission parameters, t N2O /m3 stack gas, or ppmv N2O? How are ppmv converted to t N2O /m3?

– B and D.6: Clearly distinguish baseline parameters defined ex ante (baseline emissions rate) vs. those defined ex post (absolute baseline emission).

– Delete reference to ammonia consumption in Section D.6 and D.7.

– All formulas should be numbered.

D.6-9: Nomenclature of parameters is flawed, inconsistent and unnecessarily complex. In particular:

– Use different identifiers for N2O concentration (N2O_co_STG) in the baseline (defined ex ante) and in the project activity scenario;

– Subscripts "_p" ("period"), "_m" ("monitored"?), PISCDF etc. are not applied consistently and should generally omitted where possible;

– Remove redundant parts of Section D.6 relating to Q_N2O_STG_PSCDF_m_p;

– Define parameter M_h: Operation of what? Destruction facility or overall plant?

– The formulas for calculation of N2O mass flows are misleading, because they imply that mass flows for a year (or some other period) may be calculated by multiplying the average stack gas volume flow rate with the average N2O concentration and the operation time of the destruction facility in that period. However, this would not be mathematically correct. Instead, annual mass flows must be calculated by summation of the mass flows in each monitoring interval of the online analyzer, which could be e.g. every 5 minutes.

b) State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and submitted along with CDM-NMB):

>> Yes, subject to the reservations described below.

c) State whether the application of the methodology could result in a baseline scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity.

>>Yes, but improvements are required.

Please explain:

>>

The proposed methodological approach of defining the baseline emissions rate ex ante offers the advantage of avoiding certain problems of NM0117 (stability of N2O; gaming of baseline during crediting period). However, the following weaknesses must be addressed:

– The base period for determining the baseline emissions rate (currently 4 weeks prior to implementation of the N2O destruction facility) must be justified in detail, taking into account the need to be representative and conservative.

– Gaming of the baseline emissions rate during the base period must be avoided. To this end, all parameters through which the plant operator can maximize the N2O emissions rate in the base period must be controlled. Key parameters influencing the N2O emissions rate include, but may not be limited to: Type of catalyst on the gauzes; Plant load factor; Temperature; Pressure. These parameters must be monitored during the base period, and shown to be consistent with earlier (historic) data.

– The baseline emissions rate should account for technological progress in the absence of the CDM project activity, i.e. for improvements in catalyst gauzes resulting in increased NO yields and reduced N2O emissions.

– The baseline emissions rate should account for continued deposition of platinum downstream of the ammonia burner, and for how this would influence N2O emissions in the baseline.

– During the crediting period, the specific volume of stack gas (in m3 per t of nitric acid) must be monitored and compared with values from the base period and historic values, in order to avoid inflation of the baseline through increases in specific volume of stack gas. In case the specific gas volume in the crediting period deviates from that in the base period, the ex post calculation of absolute baseline emissions must be adjusted. Provide formula for this purpose.

(4) Assessment of algorithms/formulae and type of data needed:

a) State whether the description of the methodology includes algorithms and generic formulae that can be applied to other potential project activities (if not, the proposed new methodology will be considered as a project-specific methodology):

>>Yes.

b) Explain the spatial scope of data used to determine the baseline and whether the scope is appropriate:

>>Yes, adequate:

Site: N2O emissions prior to and after installation of destruction facility

National: National regulations on N2O control

c) Explain the vintage of data used (in relation to the duration of the project crediting period) and whether the vintage of data is appropriate, indicating the period covered by the data:

>>No, not adequate:

The choice of the base period for the baseline emissions rate (4 weeks prior to installation of the destruction facility) is not sufficiently justified.

Other data (e.g., stack gas flow and emissions with the destruction facility) are monitored ex post, which is appropriate.

(5) Definition of the project boundary related to the baseline methodology:

a) State how the project boundary is defined in terms of:

i) Gases and sources

>> N2O in the stack gas;

ii) Physical delineation

>> N2O emissions via stack gas of nitric acid plant

b) Indicate whether this project boundary is appropriate:

>>Yes, appropriate.

(6) Key assumptions/parameters (including emission factors and activity levels) and data sources:

a) List the implicit and explicit key assumptions. Identify those, if any, which are problematic and explain:

>>

Problematic assumptions (all implicit):

– 4 weeks prior to implementation of the destruction facility is a representative and conservative base

period;
– N_2O emissions rate (in t N_2O/m3 stack gas) would remain constant in the absence of the project;
– Specific volume of stack gas (in m3/t nitric acid) remains constant during base period and crediting period.

b) State whether the key assumptions are arrived at in a transparent manner:

>>No.

c) Give your expert judgement on whether the assumptions/parameters are adequate:

>>No, see above.

d) Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):

>>Most data are site-specific. Regarding national regulations of NOx and N_2O, no specific sources are indicated.

e) Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:

>>Yes

f) State possible data gaps:

>> During the base period, all parameters which can influence N_2O emissions rate must be controlled (type of catalyst, plant load, pressure, temperature). Specific volume of stack gas must be monitored during base period and crediting period.

(7) Assessment of uncertainties:

a) State whether the methodology includes an assessment of uncertainties regarding:

i) The basis for determining the baseline scenario:

>>No.

ii) Algorithms/formulae:

>>No.

iii) Key assumptions:

>>No.

iv) Data:

>>No.

b) State whether the uncertainties presented are reasonable:

>>No. The analysis of uncertainties in Section F is not at all to the point.

(8) Leakage:

a) State how the baseline methodology addresses any potential leakage due to the project activity:

>>*No relevant source of leakage is identified.*

b) Indicate whether the treatment for leakage is appropriate and adequate:

>>*Adequate in principle.*

The description of the leakage section should be improved (Section D.8):
– Explain the term "utility usage", distinguishing fuels, electricity and reducing agents;
– Delete unnecessary leakage terms in formulas of Section D.9

(9) Transparency and "conservativeness":

a) Indicate whether the baseline methodology was developed in a transparent way:

>>Yes.

b) State whether the baseline methodology is conservative:

>>Conservative elements include:
– Choice of the base period immediately after installation of new gauzes. According to the proponent, this is conservative, but statement is not substantiated.

(10) Potential strengths and weaknesses of the proposed baseline methodology *(please explain)***:**

>>
See Section A.I above.

(11) Other considerations, such as a description of how national and/or sectoral policies and circumstances have been taken into account *(please explain)***:**

>>*National and sectoral regulations and policies for control of N2O will be taken into account:*
– Project facility must be in compliance at the start of the project activity;
– N2O regulation is part of the monitoring and baseline will be adjusted during the crediting period if such regulation is introduced.

(12) Applicability of the proposed methodology across project types and regions *(please indicate)***:**

>>
See Section A.I above.

(13) Any other comments:

a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:

>> See Review of NM0117.

b) Indicate any further comments:

>> See Review of NM0117

II. Proposed new monitoring methodology ***(specify title here):*** **>>**
Measurement of the abatement nitrous oxide (N2O gas) from a nitric acid plant

In respect of the proposed new monitoring methodology, evaluate each section of CDM-NMM to the draft CDM-PDD. Please provide your comments section by section:

(1) Brief description of new methodology:

Describe new methodology:

>>The methodology quantifies N2O concentrations and mass streams in the stack gas of nitric acid plants through continuous analysis of the stack gas, prior and after the installation of the N2O destruction facility.

Other monitored parameters include:
– Emergence of regulations requiring N2O control, and operational parameters needed to adjust the baseline for this regulation (if applicable, for example nitric acid production for the calculation of a N2O formation rate per tonne of nitric acid, in case this formation rate would be capped by regulation).

(2) Key assumptions/parameters:

a) List the implicit and explicit key assumptions. Identify those, if any, which are problematic and

explain:

>> No problematic assumptions identified.

b) State whether the key assumptions are arrived at in a transparent manner:

>> n/a

c) Give your expert judgement on whether the assumptions/parameters are adequate:

>> n/a

(3) Data sources and data quality:

a) Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):

>>Mostly on-site data.

b) Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:

>>Yes.

c) *State possible data gaps:*

>> None identified.

(4) Assessment of the description of the proposed methodology and its applicability:

a) State whether the proposed methodology has been described in an adequate manner:

>> Generally yes. Points to improve:

– B.1: Delete the sentence: "Emissions from the downtime of the destruction facility are neither claimed for baseline emissions nor for project emissions (outside of the project boundary)."

– B.1: Flow rate (Q_STG) in the base period is not relevant for determining the baseline emissions rate (N2O_co_STG). However, Q_STG must be monitored both in the base period and the crediting period as a basis for calculating the specific volume of stack gas per tonne of nitric acid.

– B.2.1 and B.2.3: Use different identifiers for N2O concentration (N2O_co_STG) in the baseline (defined ex ante) and in the project activity scenario.

– B.2.3: Absolute baseline emissions must be calculated based on the monitored flow of stack gas during the crediting period. Therefore, Parameter B1 (Q_STG) must be the flow of stack gas after (not before) installation of the destruction facility.

– All sections: Improve description of methodology as requested for NMB, especially: Improve nomenclature; define operation hours M_h (operation of what?); eliminate redundancies in B.2.4.

b) State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and submitted along with CDM-NMM):

>>Yes.

c) State whether this proposed monitoring methodology is compatible with the proposed baseline methodology described in CDM-NMB of the draft CDM-PDD:

>>Yes.

(5) Leakage *(please elaborate, if appropriate)***:**

>>*No monitoring of leakage parameters is foreseen, which is appropriate.*

*The term (L_N2O_p * GWP_N2O) in Section B.5 should be deleted or explained.*

(6) Quality assurance and control procedures *(please explain)***:**

>>QA/QC procedures for relevant operational parameters such as specific volume of stack gas, plant load, pressure, temperature should be indicated.

(7) Potential strengths and weaknesses of the proposed monitoring methodology *(please explain)***:**

>>No particular strengths or weaknesses identified.

(8) Applicability of the proposed methodology across project types and regions *(please indicate)***:**

>>See Section A.II above.

(9) Any other comments:

a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:

>>--

b) Indicate any further comments:

>>--

Signature of desk reviewer …Urs Brodmann

Date: 05 September 2005

Information to be completed by the secretariat	
F-CDM-NMex doc id number	
Date when the form was received at UNFCCC secretariat	
Date of transmission to the Meth Panel and EB	
Date of posting in the UNFCCC CDM web site	