



VALIDATION REPORT

MONOMEROS NITROUS OXIDE ABATEMENT PROJECT IN COLOMBIA

REPORT No. 2007-1193

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DET NORSKE VERITAS



VALIDATION REPORT

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Approved by: Mari Grooss Viddal <i>Head of Section, Norway</i>	Organisational unit: DNV Certification, International Climate Change Services
Client: MGM International	Client ref.: Walther Hugler

DET NORSKE VERITAS
CERTIFICATION AS

Veritasveien 1
1322 Høvik Norway
Tel: +47 6757 9900
Fax: +47 6757 9911
<http://www.dnv.com>

Summary:

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Monomeros Nitrous Oxide Abatement Project” in Colombia on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV’s opinion that the “Monomeros Nitrous Oxide Abatement Project” as described in the revised PDD of 20 September 2007 meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0034 (Version 02 of 02 November 2006). Hence, DNV requests the registration of the “Monomeros Nitrous Oxide Abatement Project” as a CDM project activity.

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Work verified by: Trine Kopperud, Michael Lehmann							
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***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CIS	Central Interconnected System
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MCV	Monomeros Colombo Venezolanos
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

MGM International has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Monomeros Nitrous Oxide Abatement Project” at the Monomeros Colombo Venezolanos nitric acid plant, located in the municipality of Barranquilla, Atlántico State, Colombia. This validation report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Ms. Andrea Leiroz	DNV Rio de Janeiro	Project manager, CDM validator
Mr. V. R. Kakaraparthi	DNV Bangalore	Sector expert
Ms. Trine Kopperud	DNV Oslo	Technical reviewer (applicant);
Mr Michael Lehmann	DNV Oslo	Technical reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against Kyoto Protocol criteria for the CDM, the CDM rules and modalities as agreed in the Marrakech Accords and relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AM0034 (Version 02 of 02 November 2006). The validation team has employed, based on the recommendations in the Validation and Verification Manual a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 “Monomeros Nitrous Oxide Abatement Project”

The “Monomeros Nitrous Oxide Abatement Project” consists of the installation of a secondary catalyst to abate N_2O formed inside the reactor at the Monomeros Colombo Venezolanos nitric acid plant located in the municipality of Barranquilla, Atlántico State, Colombia, operated by Monomeros Colombo Venezolanos S.A. N_2O is generated as a by-product in the nitric acid oxidation stage and is released into the atmosphere in the absence of any regulations preventing this, and hence contributes to an increase of greenhouse gases in the atmosphere.



The estimated amount of GHG emission reductions from the project is 854 350 tonnes CO₂ equivalents (tCO₂e) during the renewable 7-year crediting period, resulting in estimated average annual emission reductions of 122 050 tCO₂e.

2 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents;
- II follow-up interviews with project stakeholders;
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the “Monomeros Nitrous Oxide Abatement Project” is enclosed in Appendix A to this report.

Findings established during the validation can be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. *Corrective action requests* (CARs) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) validation protocol requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term request for *clarification* (CL) is used where additional information is needed to fully clarify an issue.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	Reference	Conclusion	Cross reference
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.</i>	<i>Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.</i>

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). A request for Clarification (CL) is used when the validation team has identified a need for further clarification.</i>

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<i>If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1 Validation protocol tables



2.1 Review of Documents

The Project Design Document (version 2 of 20 July 2007) /1/ submitted by MGM International was assessed by DNV. A revised version of the PDD dated 20 September 2007 was submitted by MGM International in order to address DNV's initial validation findings /2/.

Additional documents such as a spreadsheet containing CERs calculations /3/, a spreadsheet of calculation of investment analysis (NPV) /4/, the environmental permit /12/ and the letters sent to local stakeholders /13/ were assessed during the validation process.

2.2 Follow-up Interviews

On 09 August 2007, DNV performed interviews with Monmeros Colombo Venezolanos and MGM International during a site visit at the project site to confirm selected information and to resolve issues identified in the document review.

The main topics of the interviews are summarised in Table 1 and the persons interviewed are listed in the "References" section of this report.

Table 1 Interview topics

Interviewed organisation	Interview topics
MGM International Monmeros Colombo Venezolanos	<ul style="list-style-type: none"> ➤ Baseline campaign period (data available at the time of validation) ➤ Project approval status ➤ Credit period starting date ➤ Evidence to demonstrate additionality of the project ➤ Monitoring plan ➤ Emission reduction ex-ante estimation ➤ Environmental Licenses and legal compliance ➤ Stakeholders consultation process

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues, which needed to be clarified for DNV's positive conclusion on the project design.

The initial validation of the project identified 01 (one) corrective actions requests and 13 (thirteen) requests for clarification. The project participant's response to DNV's initial validation findings and the final version of the PDD of 20 September 2007 addressed these requests to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised are documented in more detail in the validation protocol in Appendix A.

2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another



technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The validation findings relate to the project design as documented and described in the PDD of 20 September 2007.

3.1 Participation Requirements

The Project participant is Monomeros Colombo Venezolanos of Colombia. The host Party Colombia meets all relevant participation requirements. No participating Annex I Party is yet identified.

The approval of voluntary participation by the Designated National Authority (DNA) of Colombia confirming that the project assists in achieving sustainable development has been received 15 January 2007 /14/

3.2 Project Design

Nitrous oxide is formed during the catalytic oxidation of ammonia. Over an ammonia oxidation catalyst, typically 92-96% of the fed ammonia is converted to nitric oxide (NO). The remainder participates in the undesirable side reactions that lead to nitrous oxide (N₂O), among other compounds.

The current project activity consists of the installation of a new (not previously installed) catalyst below the oxidation gauzes (a "secondary catalyst") whose sole purpose is the decomposition of N₂O.

The selected technology, a "secondary" catalyst that decomposes N₂O without affecting nitric acid production, has been developed by many catalyst suppliers (W.C. Heraeus, Johnson Matthey/Yara, Umicore and BASF). Typically the catalyst has a very high activity for N₂O decomposition (about 85% of N₂O abatement can be reached). The project participants are in negotiations with several catalyst suppliers but no catalyst supplier has yet been selected.

The current nameplate capacity of the plant is 275 t of HNO₃ / day.

A 7-year renewable crediting period is selected (with the potential of being renewed twice), starting on 1 February 2008, following completion of the baseline campaign. The starting date of the project activity (installation of catalyst) is expected to be 1 February 2008 with an expected operational lifetime of 25 years.

The project is expected to contribute to sustainable development objectives of the Colombian Government focusing on industrial technology transfer, personal safety and environmental impacts.



The project does not involve public funding, and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Colombia.

3.3 Baseline Determination

The project applies the approved consolidated baseline methodology AM0034 (Version 02 of 02 November 2006) - "*Catalytic reductions of N₂O inside the ammonia burner of nitric acid plants*" /16/). This methodology is applicable to the project as this project consists of the installation of a dedicated decomposition device to convert the nitrous oxide into nitrogen, and thereby preventing its release to the atmosphere. The project meets the methodology's applicability criteria:

- the plant is in operation since 1970;
- there is no existing N₂O destruction equipment in the plant, and the project will thus not result in the shut down of any existing N₂O destruction or abatement facility or equipment in the plant;
- the nitric acid production level will not be affected by the project;
- there is no regulation that requires abatement of N₂O in Colombia;
- there is no existing N₂O destruction or abatement technology installed;
- there will be no increase of NO_x emissions;
- the existing NO_x abatement catalyst system is not a Non Selective Catalytic Reduction (NSCR) DeNO_x unit;
- the project activity will not lead to any new process emissions of greenhouse gases, directly or indirectly;
- the continuous real-time measurements of N₂O concentration and total gas flow rate can be carried out in the exit of the process.

As required by AM0034, the baseline scenario was identified using the procedure for the "*Identification of baseline scenario*" described in the approved methodology AM0028 (Version 04 of 22 December 2006) - "*Catalytic N₂O destruction in the tail gas of nitric acid plants or Caprolactam Production Plants*" /17/, as referred to in AM0034. The methodology application first involves an identification of possible baseline scenarios, and eliminating those that do not qualify. The analysis demonstrates that the only feasible baseline is a continuation of the *status quo*, which meets current regulations, and requires neither additional investments nor additional running costs. Therefore the continuation of the current situation can be selected as the baseline scenario.

The explanation of methodological choices is clearly described. Baseline emissions are determined by measuring N₂O concentration and total flow rate in the tail gas of the nitric acid plant for one complete campaign prior to project activity implementation. At the time of writing this report the baseline campaign is still being carried out. The campaign started at 16 February 2007 and will be finished at the end of January 2008.

The PDD only contains an estimate for the baseline emissions factor representing the average N₂O emissions per tonne of nitric acid. The results from the baseline campaign and thus the actual baseline emissions factor being used to determine baseline emissions will be subject to verification.



3.4 Additionality

In accordance with AM0034, the additionality of the project is demonstrated through the “*Tool for the demonstration and assessment of additionality*” /18/ which includes the following steps:

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The selection of alternative scenarios was as described in the section 3.3 of this report.

Step 2 - Investment analysis:

Sub-step 2a. Determine appropriate analysis method: As catalytic N₂O destruction facilities generate no financial or economical benefits other than CDM related income, hence a simple cost analysis is applied.

Sub-step 2b. – Apply simple cost analysis: The proposed CDM project activity is, without the revenues from the sale of certified emission reductions, less economically and financially attractive than the baseline scenario. The investment analysis provided shows that the only revenue arises from sales of CERs. The investment consists of the engineering, construction, shipping, installation and commissioning of the secondary catalyst and the measurement equipment. The operating costs consist of the regular change of the catalyst as well as personnel costs for the supervision of the measurement equipment.

Step 3 - Barrier analysis: A barrier analysis is not used for demonstrating additionality in this project.

Step 4 - Common practice analysis: N₂O secondary abatement is not common practice in Colombia. Usually, the nitric acid industry releases into the atmosphere the N₂O generated as a by-product of the nitric acid production, as it does not have any economic value or toxicity at typical emission levels.

Given the above, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are thus additional.

3.5 Monitoring Plan

The project applies the approved consolidated monitoring methodology AM0034 (Version 02 of 02 November 2006) - “*Catalytic reductions of N₂O inside the ammonia burner of nitric acid plants*”.

The monitoring plan takes into account baseline emissions and project emissions, considering the quality control and quality assurance for data monitoring. The nitric acid plant has installed a continuous gas analyser and a flow meter in the stack. The European norm EN14181:2004, which is referred to in AM0034 for the selection and operation of the automatic measuring system (AMS), has been used. All three levels of quality assurance are clearly described in the PDD comprising the following:

QAL 1: Suitability of the AMS for the specific measuring task

QAL 2: Validation of AMS following installation

QAL 3: Ongoing quality assurance during operation



The QAL 2 tests, including measurements with a standard reference method, were performed by SGS The Netherlands B.V, a laboratory which has an accredited quality assurance system according to EN ISO/IEC 17025.

Details of the data to be collected, the frequency of data recording, its certainty, and format are described. The format for data archiving seems appropriate for the project. All data will be kept until two years after the end of the crediting period.

Responsibilities and authorities for project management, monitoring and reporting project activities as well as for organising and training of the staff in the appropriate monitoring, measurement and reporting techniques and QA/QC procedures are clearly defined. The project will require additional training and project maintenance as described in the PDD.

3.6 Calculation of GHG Emissions

The project boundary comprises the physical, geographical site of Monomeros Colombo Venezolanos's nitric acid plant and the equipment for the complete nitric acid production process from the inlet to the ammonia burner to the stack.

The project activity only comprises the GHG nitrous oxide. No leakage calculations are required according to AM0034.

The emission reduction calculations are correctly applied and transparently documented using the formulas established by AM0034.

The estimated amount of GHG emission reductions from the project is 854 350 tones CO₂ equivalents (tCO₂e) during the renewable 7-year crediting period, resulting in an estimated average annual emission reductions of 122 050 tCO₂e.

The calculation of emission reductions for the project activity is based on the baseline campaign data obtained at the time of validation. Since N₂O emissions tend to increase at the end of the campaign (related to the reduced efficiency of the primary catalyst for ammonia oxidation); applying the baseline data obtained so far results in a conservative emission reduction estimate. A spreadsheet for the calculation of the emission reductions was provided to confirm this estimate.

The overall uncertainty of the monitoring system is estimated and applied in the calculation of the estimated baseline emissions as required by AM0034.

The baseline emission factor, to be used for calculation of emission reduction during the crediting period, will be established when the baseline campaign is finished. The final baseline emission factor shall be adjusted in accordance to the results of the planned QAL 2 test and shall be verified as the first step of the verification by the DOE performing the verification of this CDM project.

3.7 Environmental Impacts

An environmental impact assessment (EIA) is not required for this project activity according to national regulation (Decree 1220). Adequate management of all possible project impacts are included in the approved Environmental Management Plan (EMP) of the facility. Any possible impacts originated during the secondary catalyst installation will be managed normally under the procedures approved by the local environmental authority (Departamento Tecnico



Administrativo de Medio Ambiente de Barranquilla - DAMAB) in the general EMP of the Monomeros Colombo Venezolanos production facility, and will be reported to the DAMAB in the periodically required reports.

No significant negative environmental impacts are expected from the implementation of the project activity.

3.8 Comments by Local Stakeholders

A local stakeholder process has been performed by inviting the relevant stakeholders via adequate communication channels to comment on the project design. A summary of the comments received has been provided in the project document. No negative comments were received.

The letters sent to the local stakeholders and the received comment was assessed.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 20 July 2007 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 27 July 2007 to 25 August 2007. No comments were received.



5 VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Monmeros Nitrous Oxide Abatement Project” at the Monmeros Colombo Venezolanos nitric acid plant located in the municipality of Barranquilla, Atlántico State, Colombia. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participant is Monmeros Colombo Venezolanos of Colombia. The host Party Colombia meets all relevant participation requirements and has provided approval of voluntary participation and confirmation that the project assists in achieving sustainable development. No participating Annex I Party is yet identified.

The “Monmeros Nitrous Oxide Abatement Project” consists of the installation of a secondary catalyst to abate N₂O formed inside the reactor at the Monmeros Colombo Venezolanos nitric acid plant..

The project correctly applies the approved baseline and monitoring methodology AM0034 (Version 02 of 02 November 2006) titled “Catalytic reductions of N₂O inside the ammonia burner of nitric acid plants”. The baseline methodology has been correctly applied and the assumptions made for the selected baseline scenario are sound. As required by the AM0034, the baseline scenario was identified using the procedure for the “Identification of baseline scenario” described in the approved methodology AM0028 (Version 04 of 22 December 2006) - “Catalytic N₂O destruction in the tail gas of nitric acid plants or Caprolactam Production Plants”. It is sufficiently demonstrated that the project is not a likely baseline scenario. An analysis of the economic attractiveness of the project alternative without the revenue from carbon credits demonstrates that the project is not a likely baseline scenario.

The total emission reductions from the project are estimated to be on the average 122 050 t CO₂e per year over the selected 7 year crediting period. The emission reduction forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change. Emission reduction calculations are correct and transparently documented using the formulas established by AM0034. The algorithm and methodologies for accounting GHG emissions are appropriate and emission factor are deemed to be of sufficiently accurate.

The monitoring methodology of AM0034 has been correctly applied. The monitoring plan sufficiently specifies the monitoring requirements.

A local stakeholder process has been performed by inviting the relevant stakeholders via adequate communication channels to comment on the project design. A summary of the comments received has been provided in the project document. No negative comments were received.

In summary, it is DNV’s opinion that the “Monmeros Nitrous Oxide Abatement Project”, as described in the project design document of 20 September 2007, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0034 (Version 02 of 02 November 2006). Hence, DNV requests the registration of the “Monmeros Nitrous Oxide Abatement Project” as a CDM project activity.



REFERENCES

Documents provided by the project proponent that relate directly to the project:

- /1/ MGM International Ltda: Project Design Document for the “Monomeros Nitrous Oxide Abatement Project”. Version 2 of 20 July 2007.
- /2/ MGM International Ltda: Project Design Document for the “Monomeros Nitrous Oxide Abatement Project”. Version 3 of 20 September 2007.
- /3/ Monomeros Colombo Venezolanos : Emissions calculation datasheet (Baseline Campaign-Monomeros-25Sept 2007.xls)
- /4/ Monomeros Colombo Venezolanos : Spreadsheet of Calculation of Investment analysis (NPV) (MCV - simple investment analysis MGM Rev 17 Sep 07.xls)
- /5/ Monomeros Colombo Venezolanos : Emissions calculation datasheet (Producciones históricas HNO₃ 2002 a 2006.xls)
- /6/ Monomeros Colombo Venezolanos : Campaign datasheet (Cuadro Long Campañas HNO₃.xls)
- /7/ Monomeros Colombo Venezolanos : Emissions calculation datasheet (Monomeros-Normal Operating Temperature Calculation.xls)
- /8/ Monomeros Colombo Venezolanos : Emissions calculation datasheet (Prueba T para validación de la Producción de HNO₃.xls)
- /9/ Monomeros Colombo Venezolanos : Emissions calculation datasheet (Shewart Chart Monomeros URAS 14.xls)
- /10/ QAL1 ABB N₂O Analyzer.pdf
- /11/ QAL2 SGS.pdf
- /12/ Monomeros Colombo Venezolanos – Atmospheric Emissions Permit # 1027.
- /13/ Letters sent to local stakeholder and the comments received.
- /14/ Ministério de Ambiente, Vivienda y Desarrollo Territorial (DNA of Colombia): *Letter of Approval*. 15 January 2007

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- /15/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /16/ CDM-EB: *Approved Baseline and Monitoring Methodology AM0034 - “Catalytic reductions of N₂O inside the ammonia burner of nitric acid plants”*. Version 02 of 02 November 2006.
- /17/ CDM-EB: *Approved Baseline and Monitoring Methodology AM0028 - “Catalytic N₂O destruction in the tail gas of nitric acid plants or Caprolactam Production Plants”*. Version 04 of 22 December 2006.
- /18/ CDM EB: *Tool for the demonstration and assessment of additionality*. Version 03 of



EB29.

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- /19/ Maria Inés Hidalgo - MGM International
- /20/ Jorge Mejia Gaona - Monmeros Colombo Venezolanos (nitric acid plant boss)
- /21/ Ricardo Cortes Camargo - Monmeros Colombo Venezolanos (chemical engineering head)
- /22/ Ladislao Oyola - Monmeros Colombo Venezolanos (electric engineering)
- /23/ Richard Polo Fontalvo - Monmeros Colombo Venezolanos (electric engineering)
- /24/ Edward Moscoso Uribe - Monmeros Colombo Venezolanos (technical manager)
- /25/ Oscar M. Miranda Ríos - Monmeros Colombo Venezolanos (chemical engineering)

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APPENDIX A

VALIDATION PROTOCOL FOR CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	NA	Table 2, Section E.4.1 No participating Annex I Party is yet identified.
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK	Table 2, Section A.3 DNA of Colombia: Letter of Approval dated 15 January 2007.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK	Table 2, Section E.4.1 DNA of Colombia: Letter of Approval dated 15 January 2007.
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-4 OK	DNA of Colombia: Letter of Approval dated 15 January 2007.
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK	Table 2, Section B.2
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Colombia.

* MoV = Means of Verification, DR= Document Review, I= Interview

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Requirement	Reference	Conclusion	Cross Reference/ Comment
financial obligations of these Parties.			
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	The Colombian designated national authority for the CDM is the Ministerio de Ambiente, Vivienda y Desarrollo Territorial.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Colombia has ratified the Kyoto Protocol on 30 November 2001.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	N/A	No participating Annex I Party is yet identified.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	N/A	No participating Annex I Party is yet identified.
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	OK	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK	Table 2, Section F
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	OK	Table 2, Section B.1.1 and D.1.1
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	CDM Modalities and Procedures §37f	OK	Table 2, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs	CDM Modalities and	OK	The PDD of 20 July 2007 was made

* MoV = Means of Verification, DR= Document Review, I= Interview

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Requirement	Reference	Conclusion	Cross Reference/ Comment
shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	Procedures §40		publicly available on DNV's climate change website. Parties, stakeholders and NGO's were through the CDM website invited to provide comments during a 30 days period from 27 July 2007 to 25 August 2007. No comments were received.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	CDM Modalities and Procedures §45c,d	OK	Table 2, Section B.2
18. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	CDM Modalities and Procedures §47	OK	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB Decision	OK	The PDD is in conformance with the UNFCCC CDM-PDD format.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The project is at the Monmeros Colombo Venezolanos (MCV) nitric acid plant located in the municipality of Barranquilla, Atlántico State, Colombia.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	The project boundary comprises the physical, geographical site of MCV's nitric acid plant and equipment for the complete nitric acid production process from the inlet to the ammonia burner to the stack.		OK
A.2. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	The project involves the installation of a secondary catalyst in the ammonia oxidation reactor in the nitric acid production process for the abatement of N ₂ O inside the reactor. The project does not involve any major changes with regards to the		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			manufacturing technology and reflects current good practices.		
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR	This project activity uses a catalyst that has the property of decomposing N ₂ O.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	The project is unlikely to be substituted by other more efficient technologies unless the chosen technology does not fulfil the expected abatement levels.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	The authority and responsibility for registration, monitoring, measurement and reporting are clearly described. The necessary provisions related to maintenance are also established in the monitoring plan. However, the project documentation does not report about initial training provision related to the new technology. Also, no procedures for training of monitoring personnel are mentioned in the monitoring plan. DNV requests further clarifications about the training.	CL-9	OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	See A.2.4.	CL-9	OK
A.3. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	The project is in line with relevant Colombian legislation.		OK
A.3.2. Is the project in line with host-country specific	/1/	DR	This is confirmed by the DNA of Colombia	CAR-1	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
CDM requirements?			through the letter of approval issued on 15 January 2007.		
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	See A.3.2.	GAR-4	OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project is expected to contribute to sustainable development objectives of the Colombian government focusing on industrial technology transfer, personal safety and environmental impact.		OK
B. Project Baseline					
<i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology					
<i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the approved baseline methodology AM0034 "Catalytic reductions of N ₂ O inside the ammonia burner of nitric acid plants" and the steps for the identification of the baseline scenario of the approved methodology AM0028 "Catalytic N ₂ O destruction in the tail gas of Nitric Acid Plants". The methodology AM0028 was not addressed in the item "B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity" of the PDD. Also, the date of	CL-2	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	See B.2.1.	CL-1 CL-3	OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	In Colombia there is currently no regulation that requires abatement of N ₂ O and the relevant air pollution control legislations pertain only to NO _x levels in stacks.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	See B.2.2 The table B.6.2 of the PDD does not indicate the type of equipment selected for measuring some parameters. Moreover, the items of the table B.6.2 are not correctly answered.	CL-5	OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	Yes, the selected baseline represents the most likely scenario among other possible scenarios.		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/ /11/	DR	In accordance with AM0034, the additionality of the project is demonstrated through the " <i>Tool for the demonstration and assessment of additionality</i> " which includes the following steps: <i>Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations:</i> . The selection of alternative scenarios was as already covered in the section 3.3 of this report. <i>Step 2 - Investment analysis:</i> <i>Sub-step 2a. Determine appropriate analysis method:</i> As the catalytic N ₂ O destruction facility generates no financial or		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>economical benefits other than CDM related income, a simple cost analysis is applied.</p> <p>Sub-step 2b. – <i>Apply simple cost analysis:</i> The proposed CDM project activity is, without the revenues from the sales of certified emission reductions, less economically and financially attractive than the baseline scenario. The investment analysis provided shows that the only revenue arises from the sales of CER's. The investment consists of the engineering, construction, shipping, installation and commissioning of the secondary catalyst and the measurement equipment. The operating costs consist of the regular change of the catalyst as well as personnel costs for the supervision of the measurement equipment. DNV requests a copy of the investment analysis spreadsheet which has to be enclosed for the CDM registration.</p> <p>Step 3 - <i>Barrier analysis:</i> A barrier analysis is not used for demonstrating additionality in this project.</p> <p>Step 4 - <i>Common practice analysis:</i> N₂O secondary abatement is not common practice in Colombia. Usually the nitric acid industry releases into the atmosphere the N₂O generated as a by-product during the production of nitric acid, as it does not have any economic value or toxicity at typical emission levels.</p>	CL-6	

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	The methodology also takes into account the possible risk of changing regulation with proper adjustments to the baseline N ₂ O decomposition rates.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes.		OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR I	The project starting date is estimated to be 1 February 2008 with an expected lifetime of 25 years.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	A renewable 7-year crediting period (with the potential of being renewed twice) was selected, starting on 1 February 2008.		OK
D. Monitoring Plan <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i>					
D.1. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously	/1/	DR	Yes, the approved monitoring methodology,		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
				CL-7	
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	See D.2.1.	CL-8 CL-7	OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	See D.2.1.	CL-8 CL-7	OK
D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	As per AM0034, leakage is not to be considered.		OK
D.3.2. Are the choices of leakage indicators reasonable?	/1/	DR	See D.3.1.		OK
D.3.3. Will it be possible to monitor / measure the specified leakage indicators?	/1/	DR	See D.3.1.		OK
D.3.4. Will the indicators give opportunity for real measurements of leakage effects?	/1/	DR	See D.3.1.		OK
D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR I	In line with the methodology, the baseline emissions will be calculated from the concentration of N ₂ O monitored in the stack gas, the volume stack gas flow and the operating hours of the campaign.	CL-4 CL-8 CL-7	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>The baseline emission factor (t N₂O/ t HNO₃) is to be arrived from the parameters monitored during the baseline campaign, the GWP of N₂O, the operating hours and the nitric acid produced during the campaign. During the crediting period of the project, the baseline emission factor is to be reassessed in case of change in the catalyst composition, changes in the regulations or in case the project campaign length is shorter than the determined normal campaign length. Since Colombia does not have any regulation for the abatement of N₂O, the baseline emission factor will be used as such.</p> <p>The nitric acid production and the operating hours are monitored.</p> <p>The baseline campaign for the determination of the baseline emission factor is in progress. All the data available up to the date of validation have been submitted by the client including spread sheet calculations showing the statistical procedures used in according to the requirement in AM0034. The spreadsheets including all baseline campaign data shall be presented for verification. The baseline emission factor is subject to final verification by the verifying DOE.</p> <p>The baseline campaign period is not clearly reported in the monitoring plan. The catalyst supplier and gauze composition for the</p>		

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			baseline is not the same as in previous campaigns. DNV requests some further clarifications regarding the baseline campaign period. The catalyst supplier and gauze composition for the baseline is not the same as in previous campaigns. See D.2.1.		
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	N ₂ O is the only GHG indicator that needs to be accounted for in the baseline and it has been taken care of in the monitoring plan.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes, it will be possible to monitor the specified baseline indicators.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?			Yes.		OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR I	The monitoring methodology AM0034 does not require the monitoring of social and environmental indicators. However social projects will be sponsored by the Monomeros Colombo Venezelanoz Company through the "FUNDAMONOMEROS" foundation.		OK
D.5.2. Is the choice of indicators for sustainability development (social, environmental, economic) reasonable?	/1/	DR	See D.5.1.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.5.3. Will it be possible to monitor the specified sustainable development indicators?	/1/	DR	See D.5.1.		OK
D.5.4. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	See D.5.1.		OK
D.6. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR I	The authority and responsibility of the project management are clearly described.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR I	The authority and responsibility for registration, monitoring, measurement and reporting are clearly described. The necessary provisions related to maintenance are also established in the monitoring plan. However, the project documentation does not report about initial training provision related to the new technology. Also, no procedures for training of monitoring personnel are mentioned in the monitoring plan. DNV requests further clarifications about the training.	CL-9	OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR I	See D.6.2.	CL-9	OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR I	All the cases that could cause unintended emissions are covered by the protection system of the plant.		OK
D.6.5. Are procedures identified for calibration of	/1/	DR	Yes. The monitoring plan includes the		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
monitoring equipment?			procedures for calibration of monitoring equipment.		
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	The procedures for maintenance of monitoring equipment and reporting are identified in the PDD.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	Procedures for monitoring, measurements and reporting are clearly described.		OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR I	Details of the data to be collected and its certainty are described. However, data recording frequency and format and location are not clearly described. Also, the monitoring plan does not report for how long the data will be archived. The table "B.7.1 Data and parameters monitored" of the PDD does not present all the parameters that need to be monitored. Moreover, the information is not correctly answered for some parameters.	CL-7 CL-8	OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	Yes.		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	Yes.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	Yes.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	Yes.		OK
D.6.13. Are procedures identified for corrective actions	/1/	DR	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
in order to provide for more accurate future monitoring and reporting?					
E. Calculation of GHG Emissions by Source <i>It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.</i>					
E.1. Project GHG Emissions <i>The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	<p>The ex-ante estimation of the project emission has been based on the following assumptions:</p> <ul style="list-style-type: none"> -The abatement efficiency of N₂O will be 85%. -The baseline emission factor is estimated from available baseline campaign data to be 0.0056 t N₂O/t nitric acid. -The project emissions have been determined as a product of the stack gas volume flow rate for the nth project campaign, concentration of N₂O in the stack gas for the project campaign and the number of operating hours in the project campaign. -The nitric acid production has been considered to be 75 398 t/year (based on the average production of five historical 		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			campaigns). -The project emission factor is estimated to be 0.00085 t N ₂ O/ t HNO ₃ .		
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Emission reduction calculations are correctly applied but not transparently documented using the formulas established by AM0034. In the item B.6.3 of the PDD, the relevant equations applied for the calculation of project emission factor and baseline emission factor are not provided. A spreadsheet for the calculation of the emission reductions was not provided to confirm this estimate.	CL 10 CL 14	OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	See E.1.1.		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	See E.1.1.		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes, project emissions due to N ₂ O have been evaluated.		OK
E.2. Leakage <i>It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	As per AM0034, leakage is not to be considered.		OK
E.2.2. Have these leakage effects been properly	/1/	DR	See E.2.1.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
accounted for in calculations?					
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	/1/	DR	See E.2.1.		OK
E.2.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	See E.2.1.		OK
E.2.5. Have conservative assumptions been used when calculating leakage?	/1/	DR	See E.2.1.		OK
E.2.6. Are uncertainties in the leakage estimates properly addressed?	/1/	DR	See E.2.1.		OK
E.3.Baseline Emissions <i>The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	<p>The ex-ante estimation of the baseline emissions has been based on data obtained up to date for the baseline campaign.</p> <p>The equations and statistical procedures, as per AM0034, are found to be correctly applied.</p> <p>The N₂O concentration at the immediate outlet of the primary catalyst is calculated from these data to be 5.6 kg N₂O/t HNO₃.</p> <p>The HNO₃ production in the baseline up to date, and the corresponding operating hours are 32 739 t and 3392 hours respectively.</p> <p>The final baseline emission factor shall be calculated and verified after the end of the baseline campaign when all data are</p>		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			available. Updated spreadsheets shall be submitted to the verifying DOE.		
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Yes, the baseline emission boundaries have been defined clearly and they include the N ₂ O emissions from the nitric acid plant in the pre-project scenario.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Emission reduction calculations are correctly applied but not transparently documented using the formulas established by AM0034. In the item B.6.3 of the PDD, the relevant equations applied for the calculation of project emission factor and baseline emission factor are not provided.. A spreadsheet for the calculation of the emission reductions was not provided to confirm this estimate.	CL-10 CL-11	OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	Baseline emissions calculations are based on monitored data.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	The uncertainties have been taken into account by calculating the sample mean, sample standard deviation, 95% confidence interval by eliminating all data that lie outside the 95% confidence interval and calculating the new sample mean from the remaining values. The overall uncertainty is obtained from the QAL 2 tests and stated in the PDD to be 2.94%.		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative	/1/	DR	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
assumptions?					
E.4.Emission Reductions <i>Validation of ex-ante estimated emission reductions.</i>					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The project is expected to reduce CO ₂ emissions to the extent of 854 350 tCO ₂ e (122 050 tCO ₂ e/year on average) during the first renewable 7-year crediting period.		OK
F. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR I	An environmental impact assessment (EIA) is not required for this project activity according to national regulation (Decree 1220). Adequate management of all possible project impacts are included in the approved Environmental Management Plan (EMP) of the facility. Any possible impacts originated during the secondary catalyst installation will be managed normally under the procedures approved by the local environmental authority (Departamento Tecnico Administrativo de Medio Ambiente de Barranquilla - DAMAB) in the general EMP of the Monomeros Colombo Venezolanos Production Facility, and will be reported to the DAMAB in the periodically required reports.		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if	/1/	DR	The EIA is not required as per the Colombian regulation.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
yes, is an EIA approved?					
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	The project will not affect the environment in any adverse way.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	There are no transboundary environmental impacts.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The project does not have any adverse environment impact.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	It is stated in the PDD that the atmospheric emissions of the nitric acid plant of the project is in compliance with the local environmental authority. The emission level established by the National authorities is 4.5 Kg/ton, expressed as NO ₂ , and the emission for the Nitric Acid Plant is 2.28 kg/ton, expressed as NO ₂ .		OK
G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR I	Yes, the relevant local stakeholders have been identified and have been consulted. The list of stakeholders has been provided in the PDD. Two meetings have been held, on May 2006 in order to present the project activity and explain the characteristics and requirements of the CDM to all the invited stakeholders.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR I	Yes. Letters have been used to invite comments by local stakeholders.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	See G.1.1.		OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	<p>DNV requests a copy of the invitation sent to the stakeholders, the comments received and the answers provided by the project proponent.</p> <p>The project participant did not identify stakeholders that have made comments.</p>	<p>CL 13</p> <p>CL 12</p>	OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Yes. As no negative or technical comments have been received, no action has been taken.		OK

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Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 The LoA from the DNA of Colombia has not been obtained.	4 A.3.2 A.3.3	This document was delivered to DNV during the validation visit.	A copy of the LoA from the DNA was assessed by DNV. This CAR is closed.
CL 1 The applicability conditions for the methodology AM0034 are not clearly justified. DNV requests clarifications about these justifications.	B.2.1 B.2.3	Changes were made. See pages 9 and 10.	The revised PDD (version 3) was assessed and the applicability conditions for the methodology AM0034 are clearly justified. This CL is closed.
CL 2 The methodology AM0028 was not addressed in the item "B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity" of the PDD. Also, the date of the methodology AM0034 and the "Tool for the demonstration and assessment of additionality" were not indicated.	B.1.1	Changes were made. See page 9.	The methodology AM0028 and the date of the methodology AM0034 and the Tool for the demonstration and assessment of additionality were included in the version 3 of the PDD. This CL is closed.
CL 3 The "Step 5 – Common practice analysis" reported in the PDD is not according to the methodology AM0028. DNV requests the correct use of the methodology steps.	B.2.1 B.2.3	Changes were made. See page 15.	The version 3 of the PDD was assessed and the changes done are sufficient. This CL is closed.
CL 4 The baseline campaign period is not clearly reported in the monitoring plan. The catalyst supplier and gauze composition for the baseline is not the same as in previous campaigns. DNV requests some further	D.4.1	Changes were made. See pages 44 (Section B.7.2) and 59 (Annex 4). The change is catalyst is regarded common practice and is made on purely economic basis. It should also be noted that FTC Plus design is known	The version 3 of the PDD was assessed and the baseline campaign period is clearly described. Documentation is received showing the economical benefit for the switch to a

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
clarifications regarding the baseline campaign period.		to modestly reduce N ₂ O formation, so the change is conservative.	new catalyst system. This CL is closed.
CL 5 The table B.6.2 of the PDD does not indicate the type of equipment selected for measuring some parameters. Moreover, the items of the table B.6.2 are not correctly answered.	B.2.5	Changes were made. See pages; 25, 26 and 17.	The table B.6.2 of the revised PDD (version 3) describes the type of equipment selected for measuring the parameters. Also, the table are correctly answered. This CL is closed.
CL 6 DNV requests a copy of the investment analysis spreadsheet which has to be enclosed for the CDM registration.	B.2.7	This document was delivered to DNV during the validation visit.	A copy of the investment analysis spreadsheet was provided and assessed by DNV. This CL is closed.
CL 7 Details of the data to be collected and its certainty are described. However, data recording frequency and format and location are not clearly described. Also, the monitoring plan does not report for how long the data will be archived.	D.2.1 D.2.2 D.2.3 D.2.4 D.2.5 D.4.1 D.6.8	Changes were made in Section B.7.1 and also in the monitoring plan (Annex 4)	The version 3 of the PDD was assessed and the data recording frequency, the format and location are clear described in the monitoring plan. This CL is closed.
CL 8 The table "B.7.1 Data and parameters monitored" of the PDD does not present all the parameters that need to be monitored. Moreover, the information is not correctly answered for some parameters.	D.2.1 D.2.2 D.2.3 D.2.4 D.2.5 D.4.1	Changes were made. For all the parameters measured during the baseline and used for the emission reduction estimation, the values applied were added. Two project parameters were added, "EF _{ma,n} " and "EF _{min} "	The last version of the PDD was assessed and all relevant data necessary for estimation or measuring the emissions reduction was included in the monitoring plan. This CL is closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
	D.6.8		
CL 9 The authority and responsibility for registration, monitoring, measurement and reporting are clearly described. The necessary provisions related to maintenance are also established in the monitoring plan. However, the project documentation does not report about initial training provision related to the new technology. Also, no procedures for training of monitoring personnel are mentioned in the monitoring plan. DNV requests further clarifications about the training.	A.2.4 A.2.5 D.6.2 D.6.3	Changes were made as per DNV requirements. See pages 44 and 59.	The version 3 of the PDD was assessed and the changes done in the monitoring plan are sufficient. Also, documented evidences for the initial training were sent to the DOE. This CL is closed.
CL 10 Emission reduction calculations are correctly applied but not transparently documented using the formulas established by AM0034. In the item B.6.3 of the PDD, the relevant equations applied for the calculation of project emission factor and baseline emission factor are not provided.	E.1.2 E.3.3	All the equations and calculations used for the emission reduction estimation were added. See page 28.	The version 3 of the PDD was assessed and the changes done in section B.6.3 are sufficient. This CL is closed.
CL 11 A spreadsheet for the calculation of the emission reductions was not provided to confirm this estimate.	E.1.2 E.3.3	This document was delivered to DNV during the validation visit.	The document Baseline Campaign-Monomeros-23August 2007.xls was assessed. This CL is closed.
CL 12 The project participant did not identify stakeholders that have made comments.	G.1.4	All the stakeholders made comments. We added a paragraph explaining this in Section E.2, page 53.	The version 3 of the PDD was assessed and a paragraph was included in the section E.2 explaining that all local stakeholders have made

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
			comments. This CL is closed.
CL 13 DNV requests a copy of the invitation sent to the stakeholders, the comments received and the answers provided by the project proponent.	G.1.4	These documents were delivered to DNV during the validation visit.	A copy of the letter sent to the stakeholders and the comments received was sent to the DOE. This CL is closed.

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APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	Yes	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1,2,3 & 9		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0028, AM0034	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0030	Yes
ACM0004	Yes	AM0031	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0032	Yes
ACM0007	Yes	AM0035	Yes
ACM0008	Yes	AM0038	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0041	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0034	Yes
AM0009, AM0037	Yes	AM0043	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	AM0046	
AM0014	Yes	AM0047	
AM0017	Yes	AMS-II.A-F, AM0044	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes
AM0021	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Trine Kopperud

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes		
CDM Validator:	--	JI Validator:	--
CDM Verifier:	Yes	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 5		

Høvik, 30 October 2007

Michael Lehmann

Technical Director, International Climate Change Services

Raman Venkata Kakaraparthi

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	--	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 5		

Technical Reviewer for (group of) methodologies:

ACM002, AMS-IA-D, AM0019, AM0026, AM0029, AM0045	Yes
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Høvik, 22 December 2006

Einar Telnes

Director, International Climate Change Services

Michael Lehmann

Technical Director



CERTIFICATE OF COMPETENCE

Andrea Leiroz

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<i>GHG Auditor:</i>	Yes		
<i>CDM Validator:</i>	Yes	<i>JI Validator:</i>	--
<i>CDM Verifier:</i>	Yes	<i>JI Verifier:</i>	--
<i>Industry Sector Expert for Sectoral Scope(s):</i>	--		

Høvik, 18 July 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director