



VALIDATION REPORT

“SASOL NITROUS OXIDE ABATEMENT PROJECT” IN SOUTH AFRICA.

REPORT No. 2007-0195

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DET NORSKE VERITAS



VALIDATION REPORT

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Approved by: Einar Telnes Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Sasol Nitro	Client ref.: Walter Hugler Quintanilla MGM International

DET NORSKE VERITAS AS

DNV Certification

DNV Certification Ltd
Palace House,
3 Cathedral Street
London SE1 9DE
United Kingdom

Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Sasol Nitrous Oxide Abatement Project" in South Africa 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 consists 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 "Sasol Nitrous Oxide Abatement Project" in South Africa as described in the revised PDD of 31 January 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 2. Hence, DNV will request the registration of the "Sasol Nitrous Oxide Abatement Project" as a CDM project activity.

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Report title: "Sasol Nitrous Oxide Abatement Project" in South Africa.							
Work carried out by: Shruthi Poonacha, Raman Venkata Kakaraparthi, Kumaraswamy Chandrashekara, Trine Kopperud							
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**Abbreviations**

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
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
MVP	Monitoring and Verification Plan
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

The Client has commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the “Sasol Nitrous Oxide Abatement Project” in South Africa (hereafter called “the project”). This report summarises the initial 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 Shruthi Poonacha	DNV Certification, Bangalore	Team leader, GHG auditor
Chandrashekara Kumaraswamy	DNV Verification, Bangalore	CDM Validator
Venkata Raman Kakaraparthi,	DNV Certification, Bangalore	GHG Auditor
Trine Kopperud	DNV Certification, Oslo	Sector Expert
Einar Telnes	DNV Certification, 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, 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 the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AM0034 Version 02. The validation team has, based on the recommendations in the Validation and Verification Manual /13/ employed 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 Description of Proposed CDM Project

The proposed project activity involves the introduction of a secondary catalyst for the abatement of undesired nitrous oxide in the ammonia oxidation reactors of the two nitric acid plants owned by the project proponent Sasol Nitro located at Sasolburg and Secunda in South Africa. In the



baseline scenario, the nitrous oxide generated in the nitric acid production 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 baseline campaigns of the project activity started in June and August 2006 for Sasolburg and Secunda respectively. The project applies a renewable crediting period, with the first crediting period of seven years starting from 1 May 2007. This project is likely to reduce 960 322 tonnes of CO₂e annually during the crediting period.

2 Methodology

The validation consists 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 /13/. The protocol shows in 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 “Sasol Nitrous Oxide Abatement Project” in South Africa is enclosed in Appendix A to this report.

Findings established during the validation can either 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 (CAR) 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 Clarification may be 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
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	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.	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.

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
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.	Gives reference to documents where the answer to the checklist question or item is found.	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.	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.	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.

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
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD version 02 dated 27 October /1/ and PDD version 05 dated 31 January 2007 /2/ submitted by MGM International and additional background documents related to the project design and baseline were reviewed /3/-/12/ as a part of the validation.

2.2 Follow-up Interviews

In the period of 13-14 December 2006 DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of SASOL Nitro, a division of SASOL Chemical Industries Limited and MGM International were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
SASOL Nitro, a division of SASOL Chemical Industries Limited: Secunda plant Sasolburg plant	➤ Project background information ➤ Project technology, operation, maintenance and monitoring ➤ Project approval status ➤ Ex-ante monitoring and baseline determination (including historical data to determine permitted operating conditions) ➤ Monitoring plan and automated measuring system
MGM International	➤ Emission reduction ex-ante estimation ➤ Environmental impact assessment ➤ Local stakeholder 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 corrective action requests and requests for clarification raised by DNV Certification Ltd., presented to the project participants during the site visit and in communications thereafter, were resolved during communications between MGM International and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the project design were necessary to resolve DNV's concerns, MGM International decided to revise the PDD and resubmitted the PDD version 05 on 31 January 2007. After reviewing the revised PDD, DNV issued this final validation report and opinion.

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

In the following sections the findings of the validation are stated. The validation findings for each validation subject are presented as follows:

- 1) The findings from the desk review of the original project design documents and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in Appendix A.
- 2) Where DNV had identified issues that need clarification or that represented a risk to the fulfilment of the project objectives, a clarification or corrective action request are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the project resulted in four (4) corrective action requests and four (4) clarification requests.

3.1 Participation Requirements

The project participant of non-Annex I Party is Sasol Nitro, a division of Sasol Chemical Industries Limited., in South Africa. The Government of Republic of South Africa ratified the Kyoto Protocol 31 July 2002 and designated Department of Mineral and Energy as the DNA.

The approval of voluntary participation by the Designated National Authorities (DNA) of Republic of South Africa confirming that the project assists in achieving sustainable development has been received 22 December 2006.

The project is developed as a unilateral project.

3.2 Project Design

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

The current project activity consists of the installation of a catalyst underneath 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 W.C. Heraeus GmbH. Heraeus claims the catalyst has a high activity (90%) for N₂O decomposition. The supplier is also the supplier of the primary catalyst used for the catalytic oxidation of ammonia.

The starting date of the project activity is 01 March 2007. The expected operational lifetime of the project is 25 years. A renewable crediting period is selected starting on 01 May 2007, following completion of the baseline campaign.



3.3 Baseline Determination

The project applies the approved baseline methodology AM0034 Version 2 - “*Catalytic reduction of N₂O inside the ammonia burner of nitric acid plant*” /14/. 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 prevent its release to the atmosphere. The project meets the methodology’s applicability criteria:

- both plants have been installed prior to 31 December 2005
- there is no existing N₂O destruction 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 South Africa;
- 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 systems are not non selective catalytic reduction (NSCR) DeNO_x units;
- 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 stack prior to the installation of the secondary catalyst for one campaign and after the installation of the secondary catalyst throughout the crediting period of the project activity

The baseline scenario was identified using the procedure for “*Identification of baseline scenario*” described in the approved methodology AM0028 - “*Catalytic N₂O destruction in the tail gas of Nitric Acid Plants*” /16/ as referred to in AM0034. The methodology application first involves an identification of possible baseline scenarios, and eliminating those that would not qualify. As a result 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. The algorithms for the calculation of emission factors, as mentioned in the approved methodology, have been correctly used for determining the baselines.

3.4 Additionality

The project additionality is demonstrated by applying the “Tool for the demonstration and assessment of additionality (version 02)” /15/ which includes the following steps:

Step 0 - Preliminary screening based on the starting date of the project activity: Step 0 can be omitted since the proposed methodology, requiring baseline measurements prior to project implementation is not applied.



Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: This step can also be omitted because of the similarity of the approaches used to determine the baseline scenario step 1. The selection of alternative scenarios is already covered in section 3.3 of this report.

Step 2 - Investment analysis:

Sub-step 2a. Determine appropriate analysis method: The catalytic N₂O destruction facilities will be installed into the existing ammonia oxidation reactors in the two plants and the operation of the facilities has the pure duty of decomposing nitrous oxide into nitrogen and oxygen. Since the facility generate no financial or economical benefits other than the CDM related income, a simple cost analysis is applied.

Sub-step 2b. – Apply simple cost analysis: The proposed CDM project activity without the revenues from the sale of certified emission reductions is less economically and financially attractive than the baseline scenario. The investment analysis provided shows that the only revenue arises from 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.

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

Step 4 - Common practice analysis: There is no regulatory requirement to limit N₂O emission in South Africa and hence N₂O secondary abatement is not common practice. All known projects that are in the pipeline are developed as CDM projects. It is common practice in the nitric acid industry to release the N₂O into the atmosphere generated as a by-product, as it does not have any economic value or toxicity at typical emission levels.

Step 5 - Impact of CDM registration: The project participants were able to demonstrate that the sale of CERs will provide the complementary incentives for the project to overcome the above presented barriers.

3.5 Monitoring Plan

The CDM project activity correctly applies the approved monitoring methodology AM0034 Version 2 - “Approved monitoring methodology for catalytic reduction of N₂O inside the ammonia burner of nitric acid plants” /14/.

The monitoring plan takes into account baseline emissions and project emissions, considering the quality control and quality assurance for data monitoring. Both the nitric acid plants have installed continuous gas analysers and flow meters 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 and 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, will be performed by a laboratory which has an accredited quality assurance system according to EN ISO/IEC 17025. The QAL 2 tests will be performed prior to finalisation of the baseline campaign.

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.

The authority and responsibility for registration, monitoring, measurement and reporting are clearly described.

Both Sasolburg and Secunda plants are ISO 9001:2000 and ISO 14001:1996 certified /12/. All necessary procedures related to the monitoring of the project will be fully integrated into Sasol's quality and environmental management system.

3.6 Calculation of GHG Emissions

The project boundaries are the physical, geographical sites of Sasolburg and Secunda nitric acid plants and the equipment for the complete nitric acid production process from the inlet of the ammonia burner (reactor for catalytic ammonia oxidation) to the outlet of the stack.

The project activity only comprises the GHG nitrous oxide. No leakage calculations are required according to AM 0034.

Emission reduction calculations are correctly applied and transparently documented using the formulas established by AM0034 /14/. The calculation of emission reductions for the project activity is based on the baseline campaign data obtained at the time of validation and will be conservative since N₂O emissions tend to increase at the end of the campaign (related to the reduced efficiency of the primary catalyst for ammonia oxidation).

The uncertainty of the monitoring system is estimated and applied in the calculation of the estimated emission reductions as required by AM0034.

The baseline emission factors, to be used for calculation of emission reduction during the crediting period, will be established when the baseline campaigns are finished. The final baseline emission factors for the two plants 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 EIA regulations of the Republic of South Africa. An internal process at Sasol Nitro has been performed according to internal procedures and the "Environmental Impact Management, a guideline document issued by the Department of Environmental Affairs and Tourism of the Republic of South Africa" /11/.

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



3.8 Comments by Local Stakeholders

The project developer has conducted open public meetings at both plants. The project developer contacted directly the stakeholders by means of a letter of invitation to participate; sending out an executive summary of the proposed project and a survey document for completion by the stakeholder. In addition an article describing the project including an invitation to submit comments and to attend the public presentations was placed in two local publications.

Comments were received from eight stakeholders. All the stakeholders who responded at the date of submission of the PDD supported the project and that the project supports sustainable development in the region and South Africa. No comments required further actions with the exception of Dr King from the Endangered Wildlife Trust and Ms Sibongile Gumbi from Earthlife Africa. The comments were properly addressed and summarised in the PDD.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 27 October 2006 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 01 November 2006 to 30 November 2006.

No comments were received.



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Sasol Nitrous Oxide Abatement Project” in South Africa on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host country is the Republic of South Africa and the project activity at present have no Annex I Party participant. The Republic of South Africa fulfils the participation criteria and has approved the project and authorised the project participant. The DNA from the Republic of South Africa confirmed that the project assists in achieving sustainable development.

The project correctly applies AM0034, version 2 “Catalytic reduction of N₂O inside the ammonia burner of nitric acid plants”. The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario, i.e. the continuation of the current situation, where there will be no installation of technology for the destruction or abatement of N₂O, is reasonable for the 7 year renewable crediting period, is deemed acceptable.

By destroying N₂O with a “secondary” catalytic N₂O technology, the project results in reductions of N₂O emissions those are measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Detailed responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been envisaged.

The total emission reductions from the project are estimated to be on the average 960 322t CO₂e per year over the selected 7 year crediting period. The emission reduction forecast has been checked and is deemed likely that the state amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV’s opinion that the “Sasol Nitrous Oxide Abatement Project” in the Republic of South Africa, as described in the PDD of 31 January 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 2. DNV thus requests the registration of the project as a CDM project activity.



REFERENCES

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

- /1/ MGM International: Project Design Document for the “Sasol Nitrous Oxide Abatement Project”, Version 1 , 27 October 2006
- /2/ MGM International: Project Design Document for the “Sasol Nitrous Oxide Abatement Project”, Version 5 , 31 January 2007
- /3/ Letter of Approval from host country South Africa, Department of Minerals and Energy, 15 January 2007
- /4/ Spread sheets of baseline campaign data: “Baseline campaign hourly – Sasolburg”, 31 January 2007; “Baseline campaign hourly - Secunda”, 31 January 2007
- /5/ Confirmation letters from technology supplier W.C. Heraeus GmbH regarding Precious metal content for primary ammonia oxidation catalyst for both plants.
- /6/ Confirmation letters from technology supplier W.C. Heraeus GmbH regarding Maximum permitted ammonia load and maximum ammonia to air ratio for both plants.
- /7/ Spread sheet for calculation of estimated emission reductions: “Sasol emission reduction calculation 31 January 2007”
- /8/ Spread sheets for normal Campaign Length for both plants.
- /9/ Spread sheet for calculation of Normal range for Sasolburg oxidation temperature
- /10/ Spread sheets for calculation of Uncertainty (UNC) for both plants
- /11/ Environmental Impact Management. Department of Environmental Affairs and Tourism. Guideline document. EIA Regulations – Implementation of section 21, 22 and 26 of the environment conservation act.
- /12/ Copies of ISO 9001:2000 and ISO 14001:1996 for Sasolburg and Secunda plants

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

- /13/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /14/ AM0034 Approved methodology “Catalytic reduction of N₂O inside the ammonia burner of nitric acid plants”, Version 2.
- /15/ CDM methodological Tool: “Tool for the demonstration and assessment of additionality”, Version 2.
- /16/ AM0028 Approved methodology “ Catalytic reductions in tail gas of nitric acid plants”

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

VALIDATION REPORT



- /17/ Johannes Louw, General Manager Fertilisers, Sasol Nitro
- /18/ Fred Van Heerden, Control System Manager, Sasol Nitro, Sasolburg
- /19/ Jaco van Straaten, Production Manager, Sasol Nitro, Sasolburg
- /20/ Renier Becker, SHERQ Manager, Sasol Nitro
- /21/ Gerrit Fourie, Control System Engineer, Sasol Nitro
- /22/ Hennie van der Walt, Manager Maintenance, Sasol Agri, Secunda
- /23/ Hendrik Marx, Control System Manager, Sasol Nitro, Secunda

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APPENDIX A

CDM VALIDATION PROTOCOL

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	OK	Table 2, Section E.4.1
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
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
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-1~~ OK	The letter of approval from the DNA of South Africa is received
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 financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	No public funding involved in the project
8. Parties participating in the CDM shall designate a national	CDM Modalities and	OK	The DNA of South Africa is the

Requirement	Reference	Conclusion	Cross Reference / Comment
authority for the CDM	Procedures §29		Department of Minerals and Energy.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	South Africa has ratified the Kyoto Protocol on the 31 July 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	NA	The project is being developed as a unilateral project.
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	NA	The project is being developed as a unilateral project
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 shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and	CDM Modalities and Procedures §40	OK	Parties, stakeholders and NGOs were invited to provide comments

Requirement	Reference	Conclusion	Cross Reference / Comment
comments have been made publicly available			through the CDM website during a 30 days period from 01 November 2006 to 30 November 2006. 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 CDM-PDD format version 3.

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	Yes, the project activity consists of the N ₂ O abatement in the two Nitric acid plants of the project proponent Sasol Nitro. The nitric acid plants are located at two sites, Sasolburg, Free state, and Secunda, Mpumalanga province, of the Republic of South Africa.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	Yes, the project's system boundaries are clearly defined and consist of the secondary catalyst that will be installed in the ammonia oxidation reactor.		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 addition of a secondary catalyst in the Ammonia oxidation reactor in the Nitric acid production process to abate nitrous oxide		OK

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

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			inside the reactor. The project does not involve any major changes with regard to the 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 been developed by W.C. Heraeus GmbH. The supplier claims this catalyst has the property of decomposing N ₂ O without affecting the production of nitric acid. It is easy to install.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	No, the project is not likely to be substituted by more efficient technologies within the project period unless the claimed efficiency is not fulfilled.		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	Since the project activity is only on the introduction of an additional secondary catalyst in the ammonia oxidation reactor and does not change the operating parameters or philosophy, extensive initial training is not envisaged.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR I	This is not mentioned in the PDD. However as the project proponent has a quality management system in place, the systems would be in place. SASOL Nitro is ISO 9001:2000 certified. For Sasolburg the certificate was valid until 15. December 2006. Sasolburg is awaiting new issuance of certificate after the audit. The clearance was ready in September 2006. SASOL Nitro Secunda is ISO 9001:2000 certified and are also awaiting new	~~GL-1~~	OK

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

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			certificates. For both plants procedures related to the project activity are partly incorporated or will be incorporated into the respective quality systems in place. Procedures for Internal audits are provided.		
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 proposed project is a voluntary initiative by Sasol Chemical Industries Limited. There are no regulatory requirements related to the restriction of nitrous oxide emissions in South Africa. The letter of approval from the DNA of South Africa is received	~~CL~~	OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The letter of approval from the DNA of South Africa confirming the same is received.	~~CAR-1~~	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The letter of approval from the DNA of South Africa confirming the same is provided.	~~CAR-1~~	OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project activity is not likely to create any other benefits other than GHG emission reductions.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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	Yes, the project applies the baseline methodology AM0034 "Catalytic reduction of N ₂ O inside the ammonia burner of nitric acid plants" Version 2, which has been approved by the CDM Executive Board.		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR I	Yes, the baseline methodology is applicable to the proposed project activity as the project aims to install a secondary abatement catalyst inside the ammonia burner of the nitric acid plant, underneath the precious metal gauze pack. The project activity also satisfies the applicability conditions of the AM0034 methodology. Both Sasolburg and Secunda plants have been in operation prior to 31 December 2005. The project activity does not have any N₂O destruction or abatement facility at present and hence will not result in the shut down of any existing N₂O destruction or abatement	~~I~~	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			facility or equipment in the plant. The project activity does not affect the level of nitric acid production. There are currently no regulatory requirements or incentives to reduce levels of N₂O emissions from nitric acid plants in South Africa. The project activity does not increase NO_x emissions. Operation of the secondary N₂O abatement catalyst to be installed under the project activity does not lead to any process emissions of greenhouse gases, directly or indirectly. Continuous real-time measurements of N₂O concentration and total gas volume flow can be carried out in the stack prior to the installation of the secondary catalyst for one campaign, and after the installation of the secondary catalyst throughout the chosen crediting period of the project activity. NO_x abatement catalyst installed is not a NSCR DeNO_x unit. The Sasolburg plant NO_x level was at the time of site visit 40 ppm (Permit is 250 ppm). The Secunda plant NO_x level was at the time of visit 150-160 ppm (Permit level is 150 ppm).		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2. Baseline Determination <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR	The baseline has been identified using procedure for identification of the baseline scenario described in the approved methodology AM0028 "Catalytic N₂O destruction in the tail gas of Nitric Acid Plants". The following scenarios have been considered as per the AM0028. - The continuation of the current situation, i.e. without the implementation of the project activity. - Alternative use of N₂O, such as: - Recycling N₂O as a feedstock - Use of N₂O for external purposes - The installation of an N₂O destruction or abatement technology. - Primary approach - Secondary approach - Tertiary approach, including non selective catalytic reduction (or NSCR De NO_x)[*]		OK

* NSCR: A NSCR DeNO_x-unit will reduce N₂O emissions as a side reaction to the NO_x-reduction., Consequently, new NSCR installation can be seen as an alternative N₂O reduction technology.

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			-Quaternary (or end of pipe) approach. • In addition to the above alternatives, the possible options that are technically feasible to handle NO_x have also been considered. - The continuation of the current situation, whether a DeNO_x unit is installed or not - Installation of a new extended absorption tower - Installation of a new selective catalytic reduction (SCR) DeNO_x unit - Installation of a new non selective catalytic reduction (NSCR) De NO_x unit - Installation of a combined NO_x /N₂O abatement unit (e.g. UHDEs Envinox process) - Installation of a new end-of-pipe treatment such as chemical (H₂O₂) scrubbing system. All the above alternatives comply with the regulations of South Africa, including the continuation of the current practice. Of all the alternatives identified the alternatives of use of N₂O for external purposes and recycling, and installation of a primary or quaternary abatement technology have been ruled out on technological barriers.		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			Since none of the remaining alternatives generate any financial or economic benefits, other than CDM revenues, a simple cost analysis is applied. Implementation of the remaining alternatives involves investment cost. The continuation of the present scenario (continuation of present practice) does not involve any investment and is in compliance with the regulations and hence is the most plausible baseline scenario. The baseline scenario has been selected as the continuation of the current practice. The investment costs of the project activity are stated in the updated PDD in Annex 5 and show no other income than revenues from CER's.		
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	Yes, the baseline determination has been done using conservative assumptions		OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	Yes		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	Yes, the baseline scenario takes into account relevant national or sectoral policies. At present, there are no national policies in South Africa that might lead to the implementation of a N₂O destruction facility in a nitric acid plant. All initiatives for abatement of N₂O in South Africa are presented as CDM projects.	I	OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	Yes		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	Yes, based on the technical, financial and prevailing practice barriers faced by the other alternatives and the economic attractiveness of maintaining status quo, the continuation of the present practice of venting the N ₂ O generated to the atmosphere is selected as the baseline scenario.		
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR I	Yes, the project additionality has been demonstrated through the use of the latest tool for additionality. Step 0: is not applicable Step 1 : As per B.2.1 Step 2 : Investment Analysis Simple cost analysis has been applied as there is no generation of income from this project activity. This project is less financially attractive from the baseline scenario as the baseline scenario requires no additional investment, and the project activity has additional investment but no returns. The project implementation cost is given in the updated PDD in Annex 5 Step 3: Barrier Analysis Has not been chosen Step 4: Common practise analysis The common practice in nitric acid plants in South Africa is to emit N₂O to the	↓	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			atmosphere. All known projects that are in the pipeline are developed as CDM projects. Ref. B 2.4 Step 5: Impact of CDM The CDM revenue will offset the substantial cost of the catalyst and other plant modifications and will enable the project activity to be undertaken.	~~L2~~	
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	Since the baseline is the maintenance of status quo, the only risk to the baseline is any change in the South African legislation which might mandate the destruction of N ₂ O. In view of this, the monitoring of the regulatory requirements is included in the monitoring plan.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes, all literature and sources have been clearly referenced in the PDD.		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 starting date of the project activity is 1 June 2006. This is not clear and needs clarification. Is the starting date the start of the baseline campaign run? (It is mentioned in the page 16 of the PDD that initial campaign for the baseline emission determination is in progress). As per the methodology the starting date of the project activity can be	~~GL2~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			after that only. Evidence is also to be provided for the start date of the project. The expected lifetime of the project is 25 years from the commissioning of the project. The starting date of the project activity is 1 March 2007 as given in updated PDD. The start of the first crediting period is 1 March 2007 following the completion of the baseline campaign.		
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	The project selects a renewable crediting period of 7 years starting on 1 May 2007.		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 approved by the CDM Executive Board?	/1/	DR	Yes, the project applies the approved monitoring methodology AM0034 "Catalytic reduction of N ₂ O inside the ammonia burner of nitric acid plants" previously approved by the CDM Executive Board.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	Yes, the methodology is applicable to this project as the project activity fulfils all the applicability conditions.		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	The monitoring methodology takes care of all the parameters required for the monitoring of GHG emission reductions and also takes into account the possibility of process manipulation to increase the CER amounts. Hence, the monitoring methodology reflects good monitoring and reporting practices.		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	Yes.		OK
D.2. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR I	In line with the methodology the following parameters will be monitored. • project volume flow in the stack gas,(measured). • project N2O concentration in the stack gas,(measured) • project operating hours • project nitric acid production during the campaign. • project campaign length, • Catalyst supplier and composition	CAR-2	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The project emission factor will be calculated from the above measured data. The parameters of stack gas temperature stack gas pressure, moving average emission factor and the minimum emission factor after the completion of 10 campaigns is to be included in the monitoring plan. It is to be clarified that during the project campaign, the operating parameters of oxidation temperature, oxidation pressure, ammonia flow rate and the air flow rate are also monitored for statistical evaluation of the data. The monitoring plan provide for the collection and archiving of all relevant data necessary for estimation of project emissions. The above issues have been corrected in the monitoring plan described in the updated PDD. See D.2.3		
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	N ₂ O is the GHG indicator that needs to be accounted for and all the parameters required to account for this have been included in the monitoring plan.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR I	Yes, it will be possible to monitor all the specified GHG indicators. Details of the implementation of the monitoring system are not provided in the PDD. The conformance of the monitoring system to best industry practices and the	~~CAR-3~~ †	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			European standard EN 14181 are also to be specified. The monitoring system and the data logging in DCS and the AMS are to be verified during the site visit. The monitoring system was explained and the data recording and transfer to spread sheets in protected excel sheets was shown during the visit. After the visit spread sheets showing the calculation of permitted ranges by using statistical methods as per AM0034 have been provided. A description of the planned monitoring is given in the updated PDD version 5 of 31 January 2007. This plan takes into account the requirements of EN14181. Since there at present is no regulation for N₂O, ABB did not perform the QAL1 test for the AO2000 URAS 14 module. The QAL 1 test reports, as referred to in PDD, are based on the basic minimum performance data from the instrument's specification sheets for this type of instrument (hence a higher uncertainty than actual is assigned). Although the QAL1 test is not performed directly for the installed analyser (ABB's AO2000 URAS14) the approach taken is conservative. The plan for performing QAL2 and QAL 3 tests are included in the monitoring plan.		
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/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
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	Yes.		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.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/ /5/ /6/	DR I	In line with the methodology, the baseline emissions (t N₂O) will be calculated from the concentration of N₂O monitored in the stack gas, the volume stack gas flow and the operating hours of the campaign. The baseline emission factor (t N₂O/ t HNO₃) is to be arrived from the parameters monitored during the baseline campaign, the GWP of N₂O and the operating hours of 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. Since South Africa does not have any regulation for the abatement of N₂O, the		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			baseline emission factor will be used as such. The nitric acid production and the operating hours are monitored. 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 is to be presented for verification., ref. E.4.1 The selection of the range of parameters to be maintained during the baseline campaign run need justification and verification during the site visit on. • Sasolburg plant: the permitted oxidation temperature is calculated based on the historic data. Spread sheet is presented by the client. The calculation of the normal operating temperature range is transparent and use the statistical procedure as required in AM0034. • For Sasolburg plant the permitted oxidation pressure has been taken from the plant design data to lack of historic data. • For the Secunda plant both the		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			temperature and pressure range is taken from plant design data since the plant do not have historical data available. The ammonia flow rate and the ammonia to air flow rate are from the catalyst suppliers. Signed documents from the supplier are provided. The normal campaign length and the catalyst history and composition are to be included in the PDD for clarity. These documents also are to be verified at site. A copy of a document from Heraeus South Africa showing nitric acid production (t 100% acid) per campaign for the last nine campaigns was provided at the visit. The data is included in the updated PDD 31 January 2007.		
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

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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	It is stated in the PDD that the monitoring of sustainable development indicators are not required by the South African DNA. This is to be confirmed with DNA of South Africa. Ref. A.3.1	I-2	OK
D.5.2. Is the choice of indicators for sustainability development (social, environmental, economic) reasonable?	/1/	DR	As per D.5.1		OK
D.5.3. Will it be possible to monitor the specified sustainable development indicators?	/1/	DR	As per D.5.1		OK
D.5.4. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	As per 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 has not been given. The management system and authority is described in Annex 4 in the updated PDD 31 January 2007.	CL-3	OK
D.6.2. Is the authority and responsibility for	/1/	DR	The authority and responsibility of the	CL-3	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
registration, monitoring, measurement and reporting clearly described?		I	registration, monitoring, measurement and reporting is to be given. The authority and responsibility for registration, monitoring, measurement and reporting is described in Annex 4 in updated PDD 31 January 2007.		
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR I	Procedures for training of monitoring personnel have not been addressed. However as the units are certified for environment and quality management systems the systems would be in place. SASOL Nitro is ISO 9001:2000 and ISO 14001:1996 certified and procedures for training and monitoring for the project activity is already or will be incorporated into the existing quality assurance system.	~~CL-3~~	OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR I	Procedures for emergency preparedness for cases where emergencies can cause unintended emissions have not been addressed and need clarification. See D.6.3	~~CL-3~~	OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR I	The equipment that will be used for monitoring has to be defined, along with the procedure for calibration. The equipment is described in updated PDD 31 January 2007. Quality assurance according to EN14181 is also included. See also D.6.3	~~CL-3~~	OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR I	Procedures for maintenance of equipment and installation have not been addressed and need clarification. See D.6.3	~~CL-3~~	OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR I	Procedures for monitoring, measurements and reporting have not been addressed and need clarification. See D.6.3	~~CL-3~~	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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	Procedures for record handling has not been addressed See D.6.3	~~CL-3~~	OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR I	Procedures for dealing with possible monitoring data adjustments and uncertainties have not been addressed See D.6.3	~~CL-3~~	OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR I	Procedures for review of reported results have not been addressed See D.6.3	~~CL-3~~	OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR I	Procedures for internal audits have not been addressed Internal audit is included in the existing quality system. Copies of the procedures are provided.	~~CL-3~~	OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR I	Procedures for project performance reviews have not been addressed See D.6.3	~~CL-3~~	OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR I	Procedures for corrective actions have not been addressed See D.6.3	~~CL-3~~	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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 I	The ex-ante estimation of the project emission has been based on the following assumptions The reduction in the N₂O in the tail gases will be 90%, as stated in the contract from the supplier. The baseline emission factors is estimated from available baseline campaign data to be 5.5 kg N₂O/t Nitric acid and 9.7 for Secunda and Sasolburg respectively.. Hence the N₂O in the outlet of the secondary catalyst is assumed to be 0.55-0.97 t N₂O/ t HNO₃ for the two plants respectively. The nitric acid productions have been considered to be 190 000 t/year at the Sasolburg plant and 290 000 t/year at the Secunda plant.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The nameplate capacity for Secunda is 860 t 100% HNO₃ per day. The value of 290 000 t/year represent 92% operating time at the nameplate capacity. Sasolburg nameplate capacity is 556.8 t 100% HNO₃ per day. The value of 190 000 t/yr corresponds to 93.4% operating time at nameplate capacity. It is conservative to consider the average productions as given in the two plants for the estimation of the ex-ante emission reductions. The project emissions has been determined as a product of 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.		
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR I	The calculations are documented in a transparent manner. Spread sheets have been provided with data available for the baseline campaigns up to the time of validation (approx. 7 month for Sasolburg and approx. 5 month for Secunda). Normal average campaign length is >7 months for both plants.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	Same as E.1.1		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	The uncertainties will have to be 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	CAR 4	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			calculating the new sample mean from the remaining values. This is accounted for in submitted calculation sheets for baseline data available up to date. See E 4.1 The uncertainty (UNC) is determined for automated monitoring systems (AMS) for both Secunda and Sasolburg.		
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.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 I	The ex-ante estimation of the baseline emissions has been based on data obtained up to date for the baseline campaigns. Spread sheets with calculations of data so far have been validated. The equations and statistical procedures as per AM0034 are	GL4	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			found to be correctly applied. The N₂O concentration at the immediate outlet of the primary catalyst is calculated from these data to be 5.5 -9.7 Kg / t Nitric acid for Sasolburg and Secunda plant respectively. The average value of the IPCC figures of 6 - 7.5 Kg N₂O / t HNO₃ for medium pressure processes. The nitric acid productions have been considered at 190 000 t/year at the Sasolburg plant and 290 000 t/year at the Secunda plant. See E.1.1 The final baseline emission factors shall be calculated and verified after the end of the baseline campaigns when all data are available. Updated spread sheets shall be submitted to the Verification 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	The calculation spreadsheets of the baseline emission factor from the baseline campaign (up to date) are transparent. The spread sheets with the data from the completed baseline campaign are to be presented for verification. See E.3.1.		OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR I	Baseline emissions calculations are based on monitored data.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the	/1/		The uncertainties have been taken into		OK

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

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
documentation?		DR	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 uncertainties of the automated monitoring systems (AMS) is determined, and documented in the updated PDD 31 January 2007		
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	Yes		OK
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	As stated in the updated PDD, the project will result in 960 322 t CO ₂ e emission reductions annually over the first seven years of crediting period. See E.1.1		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/		The environmental impacts of the project activity have been sufficiently described in the PDD. The project will not affect the environment in any adverse way.		OK
F.1.2. Are there any Host Party requirements for an	/1/	DR	The EIA is not required as per the South		OK

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

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/3/ /11/ /20/	I	African regulation. At the site visit the procedure for evaluation of projects with respect to requirements of EIA was explained by Sasol SHERQ manager. Internal documents of this process were shown.		
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 trans-boundary impacts of the project.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The project does not have any adverse environmental impact.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR I	It is stated in the PDD that both the Nitric acid plants of the project are in compliance with the Atmospheric pollution prevention Act of South Africa. The project complies with the environmental legislation in the host country. See B.1.2	†	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	Yes, the relevant local stakeholders have been identified and have been consulted. The list of stakeholders has been provided in the PDD.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR I	Yes, the stakeholders were contacted telephonically, through fax and email. A public stakeholders meeting was also held	†	OK

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

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			in the offices of Sasol Nitro. The event was also published in the local newspapers. The comments from the meeting were presented at the visit together with the evidence for the stakeholder meeting being held.		
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	The letter of approval from the DNA of South Africa is received	I-3	OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Yes		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Yes		OK

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

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1: The LoA from DNA the republic of South Africa has not been obtained	A.3.2 A.3.3	Email with required information sent to DOE 4 January 2007	OK
CAR 2: The parameters of stack gas temperature, stack gas pressure, moving average emission factor and the minimum emission factor after the completion of 10 campaigns is to be included in the monitoring plan	D.2.1	The missing parameters is to be included in updated PDD	OK. The monitoring plan in the updated PDD includes all relevant data necessary for estimation or measuring the greenhouse gas emissions.
CAR 3: Details of the implementation of the monitoring system are not provided in the PDD. The conformance of the monitoring system to best industry practices and the European standard EN 14181 are also to be specified.	D.2.3	Updated in new PDD 31 January 2007	OK. The monitoring plan in Annex 4 is taking into account the requirements of EN14181. It is to be noted that no official uncertainty is available for N ₂ O, the project proponent will use an appropriate level based on those that do exist for similar pollutants and techniques. The QAL2 report from a certified lab will be available for DOE review during the first verification audit.
CAR 4: The uncertainties will have to be taken into account by calculating the sample mean, sample standard deviation, 95% confidence interval, by eliminating all data that lie outside	E.1.4	Emails with required information sent to DOE 23 December and 31 January 2007	OK. Calculation sheets with baseline data available up to date show correct application of statistical method as per

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
the 95% confidence interval and calculating the new sample mean from the remaining values.			AM0034 and calculations are transparent. The Uncertainty (UNC) is determined for AMS for both Secunda and Sasolburg and applied in the calculation of emission reductions.
CL1: There is no description in the PDD about provisions for meeting training and maintenance needs.	A.2.5.	Emails with required documentation sent to DOE from 23 January 2007	OK. SASOL Nitro is ISO 9001:2000 and ISO 14001:1996 certified. For both plants procedures related to the project activity are already or will be incorporated into the respective quality systems in place. Procedures for Internal audits are provided.
CL2: The project's starting date is not clear.	C.1.1	New PDD sent to DOE 31 January 2007	OK. The starting date is 1. March 2007, the crediting period starts 1 May 2007.
CL 3: The project management planning including necessary procedures for the implementation and operation of the CDM project is not clearly described in the PDD.	D.6.1- D.6.13	Emails with required documentation sent to DOE 23 and 31 January.	OK. SASOL Nitro is ISO 9001:2000 and ISO 14001:1996 certified and procedures related to operation of the project is already or will be incorporated into the existing quality assurance systems. The management system and authority is described in Annex 4 in updated PDD 31 January 2007. Internal audits are included in the existing quality system.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CL4: The baseline campaigns were not complete at time of validation. The baseline emission factor is estimated from the available baseline data at the time of validation.	E.3.1/E3.3	Spread sheets sent to DOE in email 31 January 2007	OK. The final baseline emission factors shall be calculated and verified after the end of the baseline campaign when all data are available and QAL 2 tests are performed. Updated spread sheets shall be submitted to the Verification DOE

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APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Einar Telnes

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:	Yes
CDM Verifier:	Yes	JI Verifier:	Yes
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	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Shruthi Poonacha

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:	-	JI Verifier:	-
Industry Sector Expert for Sectoral Scope(s):			
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	-	AM0021	-
ACM002, AMS-IA-D, AM0019, AM0026, AM0029	-	AM0023	-
ACM003, ACM0005, AM0033, AM0040	-	AM0024	-
ACM0004	-	AM0027	-
ACM0006, AM0007, AM0015, AM0036, AM0042	-	AM0028, AM0034	-
ACM0007	-	AM0030	-
ACM0008	-	AM0031	-
ACM0009, AM0008, AMS-III.B	-	AM0032	-
AM0006, AM0016, AMS-III.D	-	AM0035	-
AM0009, AM0037	-	AM0038	-
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	-	AM0041	-
AM0014	-	AM0034	-
AM0017	-	AMS-II.A-F	-
AM0018	-	AMS-III.A	-
AM0020	-	AMS-III.E, AMS-III.F	-

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

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 4 & 5		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-IA-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

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

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	-
CDM Verifier:	-	JI Verifier:	-
Industry Sector Expert for Sectoral Scope(s):			
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	-	AM0021	-
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	-	AM0023	-
ACM003, ACM0005, AM0033, AM0040	-	AM0024	-
ACM0004	-	AM0027	-
ACM0006, AM0007, AM0015, AM0036, AM0042	-	AM0028, AM0034	-
ACM0007	-	AM0030	-
ACM0008	-	AM0031	-
ACM0009, AM0008, AMS-III.B	-	AM0032	-
AM0006, AM0016, AMS-III.D	-	AM0035	-
AM0009, AM0037	-	AM0038	-
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	-	AM0041	-
AM0014	-	AM0034	-
AM0017	-	AMS-II.A-F	-
AM0018	-	AMS-III.A	-
AM0020	-	AMS-III.E, AMS-III.F	-

Høvik, 6 November 2006

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-CDMJi-i1)

GHG Auditor: Yes

CDM Validator:

JI Validator:

CDM Verifier:

JI Verifier:

Industry Sector Expert for Sectoral Scope(s): Sectoral scope 5 & 9

Technical Reviewer for (group of) methodologies:

ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	-	AM0021	-
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	-	AM0023	-
ACM003, ACM0005, AM0033, AM0040	-	AM0024	-
ACM0004	-	AM0027	-
ACM0006, AM0007, AM0015, AM0036, AM0042	-	AM0028, AM0034	-
ACM0007	-	AM0030	-
ACM0008	-	AM0031	-
ACM0009, AM0008, AMS-III.B	-	AM0032	-
AM0006, AM0016, AMS-III.D	-	AM0035	-
AM0009, AM0037	-	AM0038	-
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	-	AM0041	-
AM0014	-	AM0034	-
AM0017	-	AMS-II.A-F	-
AM0018	-	AMS-III.A	-
AM0020	-	AMS-III.E, AMS-III.F	-

Høvik, 15. December 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director