



VALIDATION REPORT

“RAMIRANA EMISSION REDUCTION PROJECT OF AGRÍCOLA SUPER LIMITADA” IN CHILE

REPORT NO. 2005-1108

REVISION NO. 01

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2005-09-09	Project No.: 28924657
Approved by: Einar Telnes Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Agricola Super Limitada	Client ref.: Carlos A. Vives

DET NORSKE VERITAS AS

DNV Certification

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 945 748 931 MVA

Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Ramirana Emission Reduction Project of Agrícola Super Limitada” in Chile 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 rules and modalities and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

The validation consisted of the following three phases: i) a desk review of the project design, baseline and monitoring plan, 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 project, as described in the project design document (Version 3 of 11 April 2006), meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AM0006. Hence, DNV requests the registration of the “Ramirana Emission Reduction Project of Agrícola Super Limitada” as a CDM project activity.

Report No.: 2005-1108		Subject Group: Environment	
Report title: “Ramirana Emission Reduction Project of Agrícola Super Limitada” in Chile			
Work carried out by: Chandrashekara Kumaraswamy, Luis Filipe Tavares, Cintia Dias			
Work verified by: Michael Lehmann			
Date of this revision: 2005-06-08	Rev. No.: 01	Number of pages: 12	

Indexing terms	
Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification
	Market Sector
	Process Industry
<input checked="" type="checkbox"/> No distribution without permission from the client or responsible organisational unit	
<input type="checkbox"/> free distribution within DNV after 3 years	
<input type="checkbox"/> Strictly confidential	
<input type="checkbox"/> Unrestricted distribution	

© 2002 Det Norske Veritas AS

All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.



<i>Table of Content</i>	<i>Page</i>
1 INTRODUCTION	1
1.1 Validation Objective	1
1.2 Scope	1
1.3 Description of Proposed CDM Project	1
2 METHODOLOGY	2
2.1 Review of Documents	4
2.2 Follow-up Interviews	4
2.3 Resolution of Clarification and Corrective Action Requests	4
3 VALIDATION FINDINGS	5
3.1 Participation Requirements	5
3.2 Project Design	5
3.3 Baseline Determination	6
3.4 Additionality	6
3.5 Monitoring Plan	7
3.6 Calculation of GHG Emissions	8
3.7 Environmental Impacts	9
3.8 Comments by Local Stakeholders	9
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	9
5 VALIDATION OPINION	10
REFERENCES.....	11

[Appendix A Validation Protocol](#)

***Abbreviations***

B ₀	Maximum methane potential
BOD	Biochemical Oxygen Demand
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
CONAMA	National Commission for the Environment of Chile
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MCF	Methane conversion factor
MP	Monitoring Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
R _{VS}	Relative reduction of volatile solids
UNFCCC	United Nations Framework Convention on Climate Change
VS	Volatile solids excretion rate [kg/day]



1 INTRODUCTION

Agrícola Super Limitada (Agrosuper) has commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the “Ramirana Emission Reduction Project of Agrícola Super Limitada” in Chile (hereafter called “the project”).

This report summarises the findings of the validation of the project, performed on the basis of UNFCCC as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Ms Cintia Dias	DNV Rio, Brazil	Team Leader, CDM auditor
Mr Michael Lehmann	DNV Oslo, Norway	Technical reviewer
Mr Kumaraswamy C	DNV Bangalore, India	CDM auditor
Mr Luis Filipe Tavares	DNV Rio, Brazil	Waste management expert

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 AM0006. The validation team has, based on the recommendations in the Validation and Verification Manual /6/ 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 “Ramirana Emission Reduction Project of Agrícola Super Limitada”, proposed by Agrícola Super Limitada (Agrosuper), a private company engaged in the swine and poultry business, involves the implementation of an advanced manure treatment system at Agrosuper's swine farm Ramirana. The project is located in VI Region, named as Libertador Bernardo O'Higgins, Province of Cachapual, in the community of Graneros.

The advanced swine manure treatment system comprises anaerobic digestion in an ambient temperature digester (anaerobic digester) and a dissolved air flotation solid-separation unit with



aerobic treatment (activated sludge treatment). The project is implemented in two phases: i) the implementation of an anaerobic digester and subsequently ii) the implementation of the activated sludge treatment system. Construction of the anaerobic digester started in February 2002.

The expected result from this project activity will be the reduction in the volume of methane (CH₄) and nitrous oxide (N₂O) emissions compared to the emissions that would otherwise occur in a scenario with traditional swine manure treatment systems (baseline scenario). The project is expected to abate CH₄ and N₂O emissions to the extent of 410 790 tCO₂e over a 7-year crediting period. The average emission reductions are expected to be 58 684 tCO₂e per year.

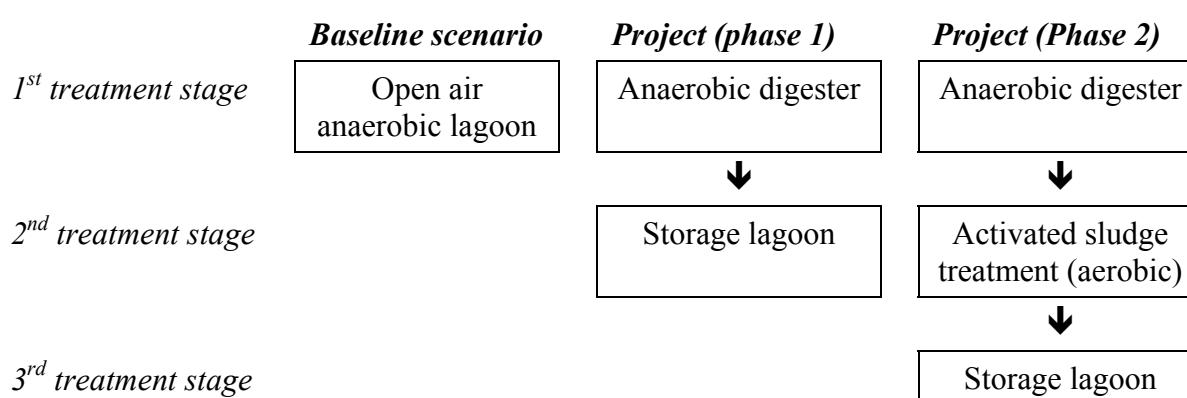


Figure 1 Overview of project and baseline scenario

2 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design, baseline and monitoring plan
- 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 /6/. 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 2.

The completed validation protocol for the “Ramirana Emission Reduction Project of Agrícola Super Limitada” project is enclosed in Appendix A to this report.



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 2 Validation protocol tables



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.

2.1 Review of Documents

The Project Design Document (PDD) submitted by Agrícola Super Limitada on 9 August 2005 /1/, the revised PDD of 11 April 2006 /2/ and supplementary Excel sheets that documented the financial and emission calculations /3//4/ have been assessed. Furthermore, the emission calculations were assessed against the IPCC guidelines /8//9/ and the US EPA *Development Document for the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations* /10/.

2.2 Follow-up Interviews

On 12-13 October 2005 DNV performed interviews with representatives of Agrosuper, Poch Ambiental and Urquidi, Riesco & Cía Abogados to confirm and resolve issues identified in the document review and visited Ramirana. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
Agrícola Súper Limitada (Agrosuper) Poch Ambiental Urquidi, Riesco & Cía Abogados	<ul style="list-style-type: none"> ➤ Baseline determination & additionality ➤ Choice of default IPCC and US EPA default values ➤ Starting date of projects ➤ Stakeholder consultations ➤ Actual implementation of projects ➤ Implementation of monitoring plan ➤ Review of monitoring records ➤ Environmental permits

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 (CAR) and requests for Clarification (CL) raised by DNV and presented to the project participants in DNV's draft validation report of 9 September 2005 (rev. 0) were resolved during communications between the project participants and DNV and through the submission of the revised PDD of 11 April 2006.



To guarantee the transparency of the validation process, the concerns raised and the responses given are documented in the validation protocol in Appendix A.

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 final validation findings relate to the project design as documented and described in the PDD of 11 April 2006.

3.1 Participation Requirements

The project participant is Agrícola Super Limitada (Agrosuper) of Chile. The host Party Chile meets all relevant participation requirements. No participating Annex I Party is yet identified. The DNA of Chile has provided approval of voluntary participation in the project /5/.

No public funding is involved in the project, and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Chile.

3.2 Project Design

The project is based on anaerobic digestion in an ambient temperature digester (anaerobic digester) and a dissolved air flotation solid-separation unit with aerobic treatment (activated sludge treatment). Once treated, the residual liquid manure enters a storage lagoon for irrigation purposes. The project design and engineering reflects good practice and is significantly better than the common practice of swine management in Chile.

Emission reductions are achieved by recovering the CH₄ produced by the anaerobic digesters and transforming CH₄ to CO₂ through combustion in a flare, thereby avoiding CH₄ emissions, and by reducing N₂O emissions through the aerobic treatment (activated sludge treatment).

After manure is treated in the digester, it goes to solid separation and enters an aerobic treatment stage (activated sludge treatment). CH₄ and N₂O emissions are considered negligible in this process, as there are no anaerobic conditions in each of the sludge management process. This treatment stage thus further reduces CH₄ emissions and reduces N₂O emissions compared to the treatment of manure in anaerobic lagoons (baseline scenario).

Treated water is eventually used for the irrigation of eucalyptus plantations and other crops surrounding the areas of the company's property. During the winter season, when no irrigation is required, effluents are accumulated in the storage lagoon.

A renewable 7 years crediting period starting on 1 October 2005 has been selected. The starting date of the project activity (start of construction) is 1 February 2002 and the expected operational lifetime of the project is 50 years.

The DNA of Chile has provided confirmation that the project assists in achieving sustainable development /5/.



3.3 Baseline Determination

The project applies the approved baseline methodology “GHG emission reduction from manure management systems” (AM0006).

This methodology is applicable to the project activity since the project is implemented at a swine farm operating in a competitive market, the project and the baseline scenario comply with all the environmental regulations of Chile, the swine population is managed under confined conditions and the technology only affects emissions from the waste management system, there is no discharge of wastewater streams to rivers and/or estuaries in the project or the baseline scenario and finally, the project does not lead to a significant increase of electricity consumption.

Based on an assessment of legal constraints, historical practice of manure management and availability of waste treatment technologies, it has been established that treatment of swine manure in anaerobic lagoons is the most attractive course of action and the prevailing practice and therefore the baseline scenario (refer to section 3.4).

3.4 Additionality

According to AM0006, the baseline scenario and additionality has been determined in four steps.

(1) As per AM0006 /7/ and the *IPCC Good Practice Guidance* /9/, the following possible baseline scenarios have been discussed: Solid storage, pit storage, storage lagoon, anaerobic lagoon, press anaerobic lagoon, digester – storage lagoon and solid separation. The dry lot system has been excluded as it is not applicable to swine barns. Also, it has been clarified during the validation that the other two scenarios listed by the *IPCC Good Practice Guidance*, i.e. deep litter and aerobic treatment, were not considered as they are not applicable to swine manure management. The list of possible scenarios has been reduced to three potential baseline scenarios, i.e. i) press (Solid Separation) anaerobic lagoon followed by land application, ii) anaerobic lagoon followed by land application and iii) anaerobic digester, followed by aerobic treatment, treatment in a storage lagoon and eventually land application (the project scenario).

(2) Based on an assessment of legal constraints, historical practice of manure management and availability of waste treatment technologies, it has been established that treatment of swine manure in anaerobic lagoons is the most attractive course of action and the prevailing practice and therefore the baseline scenario. About 50% of the Chilean pork production industry use open lagoons for their swine manure treatment, while the remaining companies practice land application as a waste management practice. Prior to project implementation, the manure practice at Ramirana was treatment in open anaerobic lagoons.

(3) An economic comparison indicates that the NPV for both phases of the project is far less attractive than the NPV of the other scenarios discussed. It has been argued that the investment costs for such projects are very high and that there are no incentives from the Chilean Government for such initiatives.

(4) It has been demonstrated that the project faces investment barriers due to high investment costs and technology barriers due to the maintenance requirements involved with this technology. Moreover, it is demonstrated that the implementation of the project exceeds current Chilean regulations for swine waste treatment and that the proposed manure treatment process is a highly advanced technology system.



Although not explicitly required by AM0006, DNV assessed whether CDM benefits were seriously considered at the time of decision making (as required by step 0 of the “Tool for the demonstration and assessment of additionality” for projects with a crediting period starting prior to the date of registration). Upon DNV’s request, the following documents were presented:

- February 2003: In the first ERPA negotiated by Agrosuper, Transalta (the buyer) asked for a right of first refusal for the future projects of Agrosuper. Specific provisions were included to regulate this right.
- August 2003: E-mail from CO₂e.com to Agrosuper asking about the willingness of Agrosuper to sell the emission reductions from future projects that were to be implemented in 2004.
- October 2003: Term sheet to be signed and finalised by Agrosuper to sell CERs from the future projects of Agrosuper to Japanese buyers, Chubu and Chogaku. Agrosuper finally decided not to sell any credits until the first projects would have finished their validation process.
- Letter to CONAMA of 07 October 2004 which mentions that one of the project objectives is to mitigate climate change

In DNV’s opinion, these documents demonstrate that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.

3.5 Monitoring Plan

The project applies the approved monitoring methodology “GHG emission reduction from manure management systems” (AM0006). The application of the monitoring methodology is transparent.

The formulae given in the approved methodology to determine emissions for every treatment stage in the baseline and project scenario are correctly applied. Details of the data to be collected, the frequency of data recording, its certainty and format, storage location and the responsibility for data collection and processing are clearly described.

The monitoring plan reflects good monitoring and reporting practices. It applies a combination of option A and option B as described in AM0006. Option B, in which the reduction of the volatile solids and nitrogen during a treatment stage is estimated based on reference data for different treatment types, is applied to determine the reduction of volatile solids and nitrogen during the first treatment stage (activated sludge treatment) and the second treatment stage (activated sludge treatment / the storage lagoon prior to the implementation of activated sludge treatment). Appropriate default values published by the IPCC /8//9/ will be applied for parameters such as the volatile solid excretion rate VS and nitrogen Nex excretion per animal, which will be adjusted for actual animal weight, and the maximum methane potential B₀, the methane conversion factor MCF and the N₂O emission factor for each treatment stage. Moreover, default relative reduction rates of volatile solids R_{VS} in anaerobic digesters published by the US EPA /10/ are applied.

After implementation of the activated sludge treatment system, the flow and biochemical oxygen demand BOD, temperature and nitrogen content of the manure leaving the aerobic treatment stage (2nd stage) is measured according to option A of AM0006 and emissions from the storage lagoon will be determined based on these parameters. The manure flow leaving the aerobic



treatment stage will not be directly measured, but calculated as the difference between measured flow into the aerobic treatment stage and the flow of sludge from the aerobic treatment stage.

Biogas flow extracted by the digester and CO₂ concentration in the biogas flow are monitored for checking the performance of the digester and the gas recovery system. However, in accordance with AM0006, these parameters are not used for calculating emission reductions.

The flare efficiency is not measured semi-annually as required by AM0006, and the combustion efficiency of 98% provided by the equipment manufacturer is applied instead. DNV acknowledges that actual CH₄ emissions from a candlestick flare cannot be accurately measured and that thus monitoring of the flare efficiency is technically difficult. The selected flare efficiency of 98% is more conservative than the destruction efficiency of 99% stipulated for closed flares in AM0016. Nonetheless, on DNV's request, a monitoring plan for ensuring proper flare performance /4/ was developed. This monitoring plan ensures proper flare performance and will thus ensure a flare efficiency of 98%. The monitoring plan requires among others weekly testing of the electric flare igniters and monthly checking of the safety valve. The results of the flare test and flare maintenance need to be documented in order to allow verification of proper flare performance and thus CH₄ destruction by the DOE verifying the project's emission reductions.

The authority and responsibility for project management, procedures for calibration and maintenance, performance reviews, internal auditing, corrective actions, etc. are not addressed specifically in the PDD. Nonetheless, these are considered prevalent in the company as Agrosuper has established certified management systems such as ISO 9001 and ISO 14001.

3.6 Calculation of GHG Emissions

All aspects related to direct and indirect GHG emissions are captured in the PDD. The project does not envisage significant emissions generated outside the project boundary and potential fugitive emissions related to the digester have been addressed within this project boundary. Since the organic matter involved in the animal diet is renewable, the carbon emissions from methane combusted in the digesters flare/boiler are considered climate neutral.

The baseline emissions are primarily the CH₄ and N₂O emissions from lagoons, while for the project emissions, apart from the CH₄ and N₂O emissions, digesters losses and leakage have also been considered. Under the strictly anaerobic conditions in the digester no N₂O emissions are expected to occur. N₂O emission reductions are only achieved by the aerobic treatment, i.e. the activated sludge treatment.

All calculations are transparently documented in Excel sheets made available to DNV.

The selection of IPCC default values for VS, B₀, MCF, R_{VS} are appropriate. Given the design of the anaerobic digesters the selected MCF of 5% for the digester is deemed appropriate, even though it is at the lower end of the MCFs proposed for anaerobic digesters by the IPCC.

Leakage effects under the approved methodology comprise only methane emissions from the project activity due to the disposal of treated manure to the environment if the treated manure is accumulated or deposited under anaerobic conditions. Since the manure is treated in an aerobic treatment stage based on the activated sludge, no leakage has been considered for this matter. Although emissions due to consumption of energy could be considered marginal, they are appropriately calculated by applying an emission factor of 0,5 tCO₂eq/MWh.



3.7 Environmental Impacts

The environmental impacts of the project are sufficiently assessed and no adverse impacts are foreseen from this project. Chilean legislation does not require an Environment Impact Assessment (EIA) to be carried out for the implementation of an anaerobic digester and an activated sludge treatment system at existing facilities.

3.8 Comments by Local Stakeholders

Local stakeholders were primarily consulted through the process of the environmental impact assessments for the swine farm. In addition, the project was presented on Agrosuper's website and discussions about the project were carried out in seminars and workshops in Chile. Given the limited social impacts of the project, the consultation of local stakeholders is deemed sufficient.

No adverse comments have been received, other than some clarifications about the project. Actions have been taken in due time on the clarifications sought and the same has been confirmed during the site visits. This approach is deemed.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD* (Version 02 of 9 August 2005) was made publicly available on www.dnv.com/certification/climatechange and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during the period 18 August to 16 September 2005. No comments were received.

* In this version of the PDD the project activity title was "Advanced swine manure treatment in Ramirana"



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Ramirana Emission Reduction Project of Agrícola Super Limitada” in Chile. The validation was performed on the basis of UNFCCC criteria for CDM project activities as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project proposes the implementation of advanced waste management systems, i.e. ambient anaerobic digestion of swine manure followed by aerobic treatment in a dissolved air flotation solid-separation unit (activated sludge treatment), at the swine farm Ramirana.

The project participant is Agrícola Super Limitada (Agrosuper) of Chile. The host Party Chile meets all relevant participation requirements. No participating Annex I Party is yet identified. The DNA of Chile has provided approval of voluntary participation in the project and has confirmed that the project assists in achieving sustainable development.

The project applies the approved baseline methodology “GHG emission reduction from manure management systems” (AM0006). The baseline methodology has been applied correctly and the assumptions made for the selected baseline scenario are sound. Based on an assessment of legal constraints, historical practice of manure management and availability of waste treatment technologies, it has been established that treatment of swine manure in anaerobic lagoons is the most attractive course of action and the prevailing practice and therefore the baseline scenario. It is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional to any that would occur in absence of the project activity.

The expected result from the project will be the reduction in the volume of methane (CH₄) and nitrous oxide (N₂O) emissions compared to the emissions that would otherwise occur in the baseline scenario. The project is expected to abate 58 684 tCO₂e per year over the first 7 years crediting period.

The monitoring methodology AM0006 is correctly applied, and the monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.

The project is not expected to have considerable environmental impacts. Chilean legislation does not require any Environment Impact Assessment to be carried out for the implementation of an anaerobic digester and an activated sludge treatment system at existing facilities.

In summary, it is DNV’s opinion that the project, as described in the project design document of 11 April 2006, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AM0006. Hence, DNV requests the registration of the “Ramirana Emission Reduction Project of Agrícola Super Limitada” as a CDM project activity.



REFERENCES

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

- /1/ Agricola Super Limitada., Poch Ambiental S.A., Urquidi, Riesco & CIA: *CDM PDD for "Advanced swine manure treatment in Ramirana"*. Version 02 of 9 August 2005.
- /2/ Agricola Super Limitada., Poch Ambiental S.A., Urquidi, Riesco & CIA: *CDM PDD for "Ramirana Emission Reduction Project of Agrícola Super Limitada"*. Version 03 of 11 April 2006.
- /3/ Agricola Super Limitada., Poch Ambiental S.A., Urquidi, Riesco & CIA: *Supporting Excel spreadsheets on financial and emission calculations for Ramirana submitted to DNV on 13 September 2005*.
- /4/ Agricola Super Limitada., Poch Ambiental S.A., Urquidi, Riesco & CIA: *Excel spreadsheet including a monitoring plan for ensuring proper flare performance submitted to DNV on 20 October 2005*.
- /5/ CONAMA (DNA of Chile): *Letter of Approval*, 6 June 2006

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

- /6/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /7/ CDM Executive Board: Approved baseline / monitoring methodology AM0006. *GHG emission reductions from manure management systems*.
- /8/ IPCC: *Good Practise Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. <http://www.ipcc.ch/>
- /9/ IPCC: *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. <http://www.ipcc.ch/>
- /10/ US EPA: *Development Document for the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*. January 2001.



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

- /11/ Agrícola Super Limitada
 - Carlos Andrés Vives, Environmental Manager
 - Hernán Vidal, Responsible for operation of the facilities
 - Freddy Abarca, Maintenance manager.
 - Luis Aravena, Senior consultant.
 - Manuel Jiménez, Manager
- /12/ Urquidi, Riesco & Compañía
 - Sergio Vives P.
- /13/ POCH Ambiental S.A.
 - Alfonso Guijón, Engineer

- o0o -

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	NA	Table 2, Section E.4.1 No Annex I party has yet been 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 CONAMA (DNA of Chile): <i>Letter of Approval</i> , 6 June 2006
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	OK	CONAMA (DNA of Chile): <i>Letter of Approval</i> , 6 June 2006
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	There is no public funding involved in the project. The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Chile.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	Chile: Comisión Nacional del Medio Ambiente (CONAMA).

Requirement	Reference	Conclusion	Cross Reference / Comment
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Chile: Ratification on 26 August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	NA	Annex I Party has not yet been 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	NA	Annex I Party has not yet been 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 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	CDM Modalities and Procedures §40	OK	The PDD was made publicly available on DNV Certification's website (www.dnv.com/certification/climate change) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during the period 18 August 2005 and 19 September 2005. No comments were received.

Requirement	Reference	Conclusion	Cross Reference / Comment
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	PDD is in line with version 02 of the CDM PDD.

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 La Ramirana advanced waste management system is located in the community of Graneros in the province of Cachapual.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	Yes, the project system boundaries are restricted to the digesters, storage lagoon aerobic treatment facility (activated sludge) and other related equipment such as the flare.		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	Yes. The project design and engineering reflects good practice through the use of an anaerobic digester and activated sludge treatment.		OK
A.2.2. Does the project use state of the art technology or would the technology result in a significantly	/1/	DR	Yes, the technology chosen is significantly better than the common practice of swine		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
better performance than any commonly used technologies in the host country?			manure management in Chile.		
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/ /11/ /12/ /13/	DR I	The project is unlikely to be replaced by other more efficient technologies, at least within the first seven year crediting period.		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/ /11/ /12/ /13/	DR I	The project will require minimal additional training and maintenance efforts. As Agrosuper is certified to ISO 9001:2000 and ISO 14001: 1996, these established management systems are expected to be adequately take care of these additional requirements.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/ /11/ /12/ /13/	DR I	Although the project documentation does not detail provisions for training and maintenance, for reasons indicated in A.2.4. it is considered acceptable		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	Chilean legislation does not warrant a specific environmental impact study for the implementation of an anaerobic digester and an activated sludge treatment system at existing facilities. The Chilean DNA (CONAMA) has also endorsed this project.		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The Chilean DNA (CONAMA) has endorsed this project.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The DNA of Chile has confirmed that the project assists in achieving sustainable development in Chile.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Other project benefits are reduced odour, pathogen vector control, effective recuperation of wastewater and the potential use of biogas for power generation.		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/ /7/	DR	The project applies the approved baseline methodology AM0006 "GHG emission reductions from manure management systems"		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/ /7/	DR	The use of the approved baseline methodology is justified: <ul style="list-style-type: none"> - as the swine farm is operating in a competitive market, - the swine population is managed under confined conditions, - the technology only affects emissions from the waste management system, - the manure management system introduced by the project and considered in the baseline is not the discharge of manure into natural water 		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			resources (e.g. rivers or estuaries) and - the project does not lead to a significant increase of electricity consumption.		
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/ /7/	DR	The application of the baseline methodology excludes every waste management alternative, leaving only the proposed project alternative (anaerobic digester plus an aerobic treatment in the second phase of the project) and two possible baseline scenarios, i.e. press (solid separation) anaerobic lagoon and anaerobic lagoon.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/ /7/	DR	Yes through the selection of the two possible baseline scenarios – press (solid separation) anaerobic lagoon and anaerobic lagoon.		OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/ /7/	DR	Project specific financial data and circumstances for manure treatment have been considered.		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/ /7/	DR	The exclusion criteria of the identified plausible scenarios are based on host country legal constraints, historical practice of waste management in the company, availability of waste treatment technologies etc. While as per AM0006, all possible baseline scenarios listed in the IPCC	CL-1	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			guidelines must be discussed and taken into account, it is seen that the scenarios “deep litter” and “aerobic treatment” have not been considered and discussed. It is also argued in the PDD that 50% of the swine industry in Chile uses anaerobic lagoons. The PDD should be elaborated to describe the practice in the remaining 50% and the practise at Ramirana prior to project implementation.		
B.2.5. Is the baseline determination compatible with the available data?	/1/ /7/	DR	Yes. It is compatible as per available data and based on IPCC and US EPA default values.		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/ /7/	DR	Yes and as in B.2.1.		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/ /7/	DR	Yes, it has been demonstrated through a series of steps, such as the listing of all possible baseline scenarios, identification of plausible scenarios, exclusion of potential baseline through a set of criteria and through the assessment of technological and investment barriers. For projects implemented prior to registration, evidence should be provided to demonstrate that the incentive provided by the CDM was seriously considered in the decision to implement the project. Although not required by AM0006, DNV would like to receive further information on how CDM benefits were considered in the decision to implement the project.	CL-2	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2.8. Have the major risks to the baseline been identified?	/1/ /7/	DR	No major risks are foreseen.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/ /7/ /8/ /9/ /10/	DR	IPCC guidelines and US EPA are the sources.		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/ /2/	DR	The project starting date is 1 October 2005 and the expected operational lifetime of the project is 50 years. The project's starting date was eventually revised to 1 February 2002, when construction of the digester started.		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	The project applies for a crediting period of 7 years starting on 1 October 2005 with the potential for subsequent renewals. However, since the project's starting date is after the registration of the first CDM project (18 November 2004), the project's crediting period may only start after the date of registration of the project as CDM project activity.	CAR-1	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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/ /7/	DR	The project applies the approved monitoring methodology AM0006 "GHG emission reductions from manure management systems".		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/ /7/	DR	The use of the approved monitoring methodology is justified, as the swine farm is operating in a competitive market, the swine population is managed under confined conditions, the technology only affects emissions from the waste management system, the manure management system introduced by the project and considered in the baseline is not the discharge of manure into natural water resources (e.g. rivers or estuaries) and the project does not lead to a significant increase of electricity consumption.		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/ /7/	DR	The project applies option B as described in AM0006: The reduction of volatile solids		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			and nitrogen during a treatment stage is estimated based on reference data for different treatment types. Default values for parameters such as volatile solid and nitrogen excretion rates are considered. Measuring these values would involve huge investments due to the inherent difficulties of performing measurements of solid content and other operational problems. Option A of the baseline methodology is chosen to represent emissions from the storage lagoon once activated sludge treatment is implemented. The manure flow to the storage lagoon is calculated as the total inlet flow minus sludge volume. Total inlet flow is monitored from a flow meter installed before the activated sludge treatment.		
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/ /7/	DR	Yes with the exception of the choice of data for the calculation of VS (Table 4 in Annex 3 to the PDD). It needs to be clarified whether IPCC default data or whether data monitored by Agrosuper will be used.	CL-3	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	/1/ /7/	DR	Collection and archiving of data is in paper form.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
boundary during the crediting period?					
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	Yes.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/ /4/ /7/ /8/ /9/	DR	All data are measured values except the flare efficiency, which is not measured semi-annually as required by AM0006, but the combustion efficiency provided by the equipment manufacturer is provided. It needs to be clarified whether the flare efficiency can be calculated periodically based on the methane content in the stack and/or whether the combustion efficiency of 98% provided by the equipment manufacturer represents a conservative value.	CL-4	OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	Yes, except that the biogas flow extracted by the digester, in the project scenario, is indicated in terms of m ³ /day. As per AM006, this data shall be SCFM/day.	CL-5	OK
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/ /3/ /4/	DR	Leakage effects to be considered by AM0006 comprise only methane emissions from the project activity due to the disposal of treated manure to the environment, if the treated manure is accumulated or deposited under anaerobic conditions. As after		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			manure is treated in the digester, the sludge goes to solid separation and enters in an aerobic treatment based on the activated sludge, then it is used as a fertilizer, no leakage has been considered.		
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	Yes, collection and archiving of data is in paper and electronic forms.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	Yes.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	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?	/4/ /7/	DR	The DNA of Chile and AM0006 do not require monitoring of sustainable development indicators.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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/ /4/ /11/ /12/ /13/	DR I	The company Agrosuper has been certified to ISO 9001:2000 and ISO 14001:1996. The established management systems and procedures are expected to be adequately addressing these issues and this is considered to be acceptable.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/ /4/ /11/ /12/ /13/	DR I	The responsibilities are clearly indicated in section D.4 of the PDD for the data variables. Also refer to D.6.1.		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/ /4/ /11/ /12/ /13/	DR I	No procedures for training of monitoring personnel are described, but the project only requires limited monitoring, which is part of normal operations. Also refer to D.6.1.		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	No GHG emission relevant emergency situations are expected to occur.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/ /4/ /11/	DR I	As in D.6.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
	/12/ /13/				
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		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/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/ /4/ /11/ /12/ /13/	DR I	As in D.6.1		OK
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.Predicted Project GHG Emissions <i>The validation of predicted 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/ /4/	DR	Since the organic matter involved in the animal diet is renewable, the carbon emissions from methane combusted in the digesters flare/boiler are biogenic and thus not accounted for. CH ₄ and N ₂ O emissions from the anaerobic digester, the aerobic treatment system and the storage lagoon are considered.		OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/ /3/ /4/	DR	Yes. All calculations are transparently documented in Excel sheets made available to DNV.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/ /3/ /4/	DR	IPCC default values for developed countries have been used. This is appropriate for Agrosuper farms due to the following		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>reasons:</p> <p>The genetic source of the production operations livestock originate from Canadian genetic roots for high production standards.</p> <p>The project specific average swine weights are more similar to developed country IPCC default values.</p> <p>Diets in the project are similar to diets in developed countries.</p>		
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/ /3/ /4/	DR	No assessment of the inherent uncertainties in using IPCC default values must be included.		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/ /3/ /4/	DR	The gases considered are CH ₄ and N ₂ O as indicated in AM0006. Under the strictly anaerobic conditions in the digester no N ₂ O emissions are expected to occur.		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.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/ /7/	DR	Leakage effects under the approved methodology comprise only methane emissions from the project activity due to the disposal of treated manure to the environment, if the treated manure is accumulated or deposited under anaerobic conditions. Since manure is treated in an aerobic treatment system, no leakage has		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			been considered. Emissions due to consumption of energy in the digesters are marginal but nonetheless accounted.		
E.3. Baseline Emissions <i>The validation of predicted 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/ /3/	DR	The baseline emissions are restricted to the CH ₄ and N ₂ O emissions from the anaerobic lagoons.		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/ /3/	DR	Yes, and are restricted to on-site emissions only.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/ /3/	DR	Yes.		OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/ /3/	DR	Yes. The boundary includes only the emissions reductions from manure management techniques dealing with swine manure from a cluster of production units discharging manure to handling systems.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/ /3/	DR	Yes		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/ /3/	DR	Yes		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.4.Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/ /3/	DR	Yes. The project is expected to abate CH ₄ and N ₂ O emissions to the extent 410 790 tCO ₂ e over a 7-year crediting period. The average emission reductions are expected to be 58 684tCO ₂ e per year.		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	Chilean legislation does not require an Environmental Impact Assessment to be carried for the implementation of an anaerobic digester or aerobic treatment system at an existing facility. No adverse impacts are foreseen from this project.		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	As in F.1.1		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	Not foreseen		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	Not foreseen		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	No adverse impacts are foreseen from this project.		OK
F.1.6. Does the project comply with environmental	/1/	DR	As in F.1.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
legislation in the host country?					
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/ /11/ /12/ /13/	DR I	Stakeholders were consulted through the EIS, participation in seminars and internet displays. This is considered adequate.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /11/ /12/ /13/	DR I	Mainly through EIS's for the waste management systems, presence of Agrosuper in seminars and workshops and display of information related to the project on the company's website.		OK
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/ /11/ /12/ /13/	DR I	EIS's have been conducted only for the waste management systems. For the CDM project activity (implementation of digesters and storage lagoon), Chilean legislation does not warrant any stakeholder consultation process.		OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/ /11/ /12/ /13/	DR I	No adverse comments have been received, other than some clarifications about the project.		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/ /11/ /12/ /13/	DR	As no adverse comments have been received, no actions were required.		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
<p>CAR 1: Since the project's starting date is after the registration of the first CDM project (18 November 2004), the project's crediting period may only start after the date of registration of the project as CDM project activity.</p>	C.1.2	The project starting date for Ramirana is 1 February 2002.	<p>The starting date has been corrected and now considers the date when the project's construction started on 1 February 2002. Evidence for this starting date was presented by Agrosuper.</p> <p>This CAR is therefore closed.</p>
<p>CL 1: While as per AM0006, all possible baseline scenarios listed in the IPCC guidelines must be discussed and taken into account, it is seen that the scenarios "deep litter" and "aerobic treatment" have not been considered and discussed. It is also argued in the PDD that 50% of the swine industry in Chile uses anaerobic lagoons. The PDD should be elaborated to describe the practice in the remaining 50% and the practise at Ramirana prior to project implementation.</p>	B.2.4	<p>The deep litter was not discussed as potential baseline scenario because it is not applicable to swine manure considering the characteristics of the waste and the large quantity of manure produced in Agrosuper farms. Regarding the aerobic treatment, it is not a common practice for swine waste management in the national and international context. Therefore, these scenarios are excluded from the plausible alternative for manure treatment.</p> <p>In Chile, 90% of the swine production is subscribed to the Clean Development Agreement, which is represented by 40 companies out of 50. The PDD establishes that approximately 50% of the companies in Chile (including Agrosuper) have introduced the open lagoon system, in the context of the Clean Development Agreement. The rest of the companies have land</p>	<p>The substantiation provided for not considering "deep litter" and "aerobic treatment" scenarios is accepted.</p> <p>Complementary information provided assures that the remaining companies in Chile practice land application as a waste management practice. Prior to this project implementation, the manure treatment practice at Ramirana was anaerobic lagoons.</p> <p>This CL is therefore closed.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		application as a prevailing waste management practice, considering in some cases an inefficient previous solids separation. There are no official records to quantify accurately the distribution of waste management practices, but Agrosuper could arrange an interview with the general manager of the Swine producing association (ASPROCER) to confirm this statement	
<p>CL 2:</p> <p>For projects implemented prior to registration, evidence should be provided to demonstrate that the incentive provided by the CDM was seriously considered in the decision to implement the project. Although not required AM0006, DNV would like to receive further information on how the CDM was considered in the decision to implement the project.</p>	B.2.7	<p>All arguments stated in the previous PDD's for the CDM project activities of Peralillo, Pocillas, La Estrella, Corneche and Los Guindos, are still valid for these new CDM project activities since it is based in the same CDM policy of Agrosuper. Additional arguments are presented in the attached excel sheet "dates".</p> <p>As suggested by the validator, we will repeat the considerations of the CDM expressed in Chapter A, into chapter B.</p>	<p>The following documents were presented to DNV:</p> <ul style="list-style-type: none"> - Letter to CONAMA of 10 August 2000 which mentions that one of the project objectives is to mitigate climate change - E-mail by potential buyer of CERs of 19 July 2001 in which the buyer proposes to buy CERs from the project <p>These documents demonstrate that the incentive from the CDM was seriously considered in the decision to proceed with the project activity, and DNV considers the presented documents to represent sufficient evidence.</p> <p>This CL is therefore closed.</p>
<p>CL 3:</p> <p>The choice of data for the calculation of VS (Table 4 in Annex 3 to the PDD) needs to be clarified, i.e. whether IPCC default data or whether data monitored by Agrosuper will be</p>	D.1.4	<p>In order to quantify the emissions of each waste treatment scenario, the IPCC default value of Volatile Solids for developed country, has been used. Table 4 in Annex 3 represents only a</p>	<p>The provided clarification indicates that only IPCC default values will be used.</p> <p>This CL is therefore closed.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
used.		comparison in order to analyse the applicability of this value.	
<p>CL 4:</p> <p>It needs to be clarified whether the flare efficiency can be calculated periodically based on the methane content in the stack and/or whether the combustion efficiency of 98% provided by the equipment manufacturer represents a conservative value.</p>	D.2.3	<p>The actual “in field” emissions from a candlestick flare cannot be accurately measured or monitored because of the immediate dilution of the flame cone to atmosphere, and the continual movement of the central flame cone because of air and wind currents. The theoretical destruction efficiency provided by the equipment manufacturer represents a conservative value and is supported in an EPA “Air Pollution Technology Fact Sheet” entitled EPA-CICA Fact Sheet-Flare (EPA-452/F-03-019).</p> <p>A monitoring plan (Excel sheet) for ensuring proper flare performance was developed and submitted to DNV during the validation of the current registered Agrosuper CDM projects.</p>	<p>DNV acknowledges that actual CH₄ emissions from a candlestick flare cannot be accurately measured and that thus monitoring of the flare efficiency is technically difficult. . The selected flare efficiency of 98% is more conservative than the destruction efficiency of 99% stipulated for closed flares in AM0016.</p> <p>The provided monitoring plan ensures proper flare performance and thus ensures a flare efficiency of 98%. The monitoring plan requires among others weekly testing of the electric flare igniters and monthly checking of the safety valve.</p> <p>The results of the flare test and flare maintenance need to be documented in order to allow verification of proper flare performance and thus CH₄ destruction by the DOE performing verification of the project's emission reductions.</p> <p>This CL is therefore closed.</p>
<p>CL 5:</p> <p>The biogas flow extracted by the digester, in the project scenario, is indicated in terms of m³/day, in the monitoring plan. As per AM006, this data shall be SCFM/day.</p>	D.2.4	<p>Although the applicable approved monitoring methodology AM0006 has a mistake on the units of this parameter (SCFM, Standard cubic feet per minute), the original CDM registers have considered that for heated digesters biogas flow rate must be</p>	<p>The provided clarification sufficiently addresses DNV's request for clarification.</p> <p>This CL is therefore closed.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		<p>monitored as SCFM and for ambient temperature digesters the monitoring is on cubic meters per day. The objective is to measure the biogas flow rate.</p> <p>The conversion of cubic feet to cubic meter is necessary to work with the metric system.</p> <p>A recommendation is needed to confirm if the original units of the approved methodology should be incorporated in the PDD.</p>	

- o0o -