VALIDATION REPORT

"BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil"

REPORT NO. 2008-1451

REVISION NO. 01

DET NORSKE VERITAS

VALIDATION REPORT

DET NORSKE VERITAS
CERTIFICATION AS

Veritasveien 1
N-1322 Høvik
Norway
http://www.dnv.com

Date of first issue: 2008-09-25	Project No.: PRJC-87902-2008-CCS-BRA
Approved by: Trine Kopperud Head of Section	Organisational unit: Climate Change Services
Client: Brascarbon Consultoria, Projetos e Representação Ltda & Luso Carbon Fund	Client ref.: Luiz Lasas and Paulo Caetano

Project Name: "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil"
Country: Brazil
Methodology: AMS-III.D
Version:14
GHG reducing Measure/Technology: "*Methane recovery in animal manure management systems*"
ER estimate: 316 022 tCO_2e over 7 years (45 146 tCO_2e annually)
Size
☐ Large Scale
☒ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval and submission for registration
☐ Rejected

This validation report summarizes the findings of the validation. In summary, it is DNV's opinion that the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil", as described in the PDD of 16 March 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-III.D version 14. DNV thus requests the registration of the project as a CDM project activity.
Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.

Report No.:	Date of this revision:	Rev. No.
2008-1451	2009-06-19	01

Report title:
"BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil"

Work carried out by:
Luis Filipe Tavares, Andrea Leiroz

Work verified by:
Kumaraswamy Chandrashekara (Draft report), Anu Chaudhary (Applicant, Final report), Michael Lehmann

Key words:

☒ No distribution without permission from the Client or responsible organisational unit

☐ Limited distribution

☐ Unrestricted distribution

Abbreviations

B_0	Maximum methane producing capacity of the manure (m^3CH_4/kg VS)
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_2e	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
MCF	Methane Conversion Factor (capacity of facility to produce methane)
NGO	Non-governmental Organisation
NPV	Net Present Value
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
VS	Volatile Solids produced daily per head

TABLE OF CONTENTS

VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil", located in the São Paulo State, Brazil. The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participants are Brascarbon Consultoria, Projetos e Representação Ltda of Brazil and Luso Carbon Fund authorized by Portugal as Annex 1 Party. All Parties involved, i.e., Brazil and Portugal, meet the requirements to participate in the CDM.

The objective of the project is to capture and burn the biogas generated through the decomposition of the swine manure produced at selected swine farms.

By improving the environmental and working conditions for swine production, the project is in line with the current sustainable development priorities of Brazil.

The project applies the approved simplified baseline and monitoring methodology AMS-III.D, i.e. "Methane recovery in animal manure management systems" (version 14). The baseline methodology has been correctly applied and the assumptions made for the selected baseline scenario are sound. 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 the absence of the project activity.

The monitoring methodology has been correctly applied. The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.

By capturing and destroying biogas from swine manure, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Emission reductions are directly monitored and calculated ex-post, using the approach given in AMS-III.D (version 14). The ex-ante estimation of emission reductions and the projected biogas generation from the swine manure was determined using the 2006 IPCC tier 2 approach.

In summary, it is DNV's opinion that the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil", as described in the revised project design document of 16 March 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-III.D (version 14). Hence, DNV will request the registration of the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil" as a CDM project activity.

Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development..

2 INTRODUCTION

Brascarbon Consultoria, Projetos e Representação Ltda& Luso Carbon Fund have commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil", located in the São Paulo State, Brazil. This validation report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

				Type of involvement					
Role/Qualification	***Last Name***	***First Name***	***Country***	Desk review	Site visit/Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Leiroz	Andrea	Brazil	x			x		
Sector expert	Tavares	Luis Filipe	Brazil	x	x	x			x
Technical reviewer (Draft report)	Kumaraswamy	Chandrashekara	India					x	
Technical reviewer (Applicant, final report)	Chaudhary	Anu	India					x	
Technical reviewer (Final report)	Lehmann	Michael	Norway					x	

The qualification of each individual validation team member is detailed in Appendix B to this report.

2.1 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).

2.2 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 AMS-III.D (version 14). The validation team has based the validation on the recommendations in the Validation and Verification Manual. /23/

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.

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design documents

II follow-up interviews with project stakeholders

III the resolution of outstanding issues and the issuance of the final validation report and opinion.

3.1 Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

/1/ Project Design Document for the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil". version 1 dated of 01 May 2008.

/2/ Project Design Document for the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil". version 2 dated of 16 March 2009.

/3/ Emission reduction calculation: spreadsheet PDD 2 BASCARBON BC5 BRA Ver. 15.

/4/ Format Brascarbon 03.002 for swine population account

/5/ Construction contract signed by Brascarbon and Tercel Terraplanagem on 10 July 2008 for the farms Passagarda, Felilcidade and Anália Franco

/6/ Sow purchase receipt 7822 from Agroceres sold to Fabio Bressiani and receipt 305 to Daniel Dianas Ribeiro

/7/ Swine food formulation from Agroceres to Palmeiras Farm, Felicidade Farm, Passargada Farm and São Benedito Farm

/8/ Methane analyzer http://www.geotechenv.com/gem2000_plus.pdf

/9/ Agrocerespic http://www.agrocerespic.com.br/quemsomos/index.html (joint venture of Agroceres and Pig Improvement co from UK; http://www.agroceresnutricao.com.br/principal_1024.jsp

/10/ Letter of Intent issued on 01 June 2007 by Climate Change Capital Ltd / Ecoprogresso to Brascarbon for purchasing of emissions reductions from piggery waste methane reductions projects in Brazil.

/11/ Environment Impact Assessment of Brascarbon PDD 2 BCA.BRA.02

/12/ Construction schedule PDD 2: BCA-BRA-002

/13/ POP 1 Combust. Temperature Monitoring Tf
POP 2 Rules of Town
POP 3 Swine Population Counting
POP 4 BIOGÁS VOLUME MEASURING Bg_{burnt}
POP 5 Methane Contend Monitoring W_{ch4}
POP 6 Biogás Temperature Monitoring
POP 7 Methane Density - Dch4
POP 8 Flare Efficiency Timetable Fey
POP 9 Biodigestor Sludge Removal
POP 12 General Maintenance
POP 13 Swine Wheigt
POP 14 Swine Feed Formulation

/14/ São Paulo State Annual average temperature: http://www.cppse.embrapa.br/080servicos/dados-meteorologicos/

/15/ ECOGAS enclosed flare specification

/16/ Methane analyzer http://www.geotechenv.com/gem2000_plus.pdf

/17/ Electricity price in Brazil http://www.aneel.gov.br/area.cfm?idArea=493&idPerfil=4

/18/ Brazilian Swine Producers Association http://www.abcs.org.br/portal//mun_sui/producao/genetica/principais.jsp http://www.aps.org.br/component/content/article/1-timas/357-a-energia-gerada-pela-suinocultura-.html

/19/ Brazilian swine producers and CDM developers http://www.sadia.com.br/br/instituto/ http://www.perdigao.com.br/empresasperdigao/instituto1.cfm?codigo=15 http://www.agcert.com/ http://www.ecobiocarbon.com.br/

/20/ Brazilian government loan - SELIC http://www.bcb.gov.br

/21/ Brazilian Water Environment Legislation http://www.mma.gov.br/port/conama/res/res05/res35705.pdf

/22/ Practice of swine manure treatment http://www.cnpsa.embrapa.br/down.php?tipo=publicacoes&cod_publicacao=186

/23/ CDM Executive Board: Validation and Verification Manual Version 01. http://cdm.unfccc.int/EB/044/eb44_repan03.pdf

/24/ CDM Executive Board: Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities": Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activities. AMS-III.D – "Methane recovery in animal manure management systems" Version 14.

/25/ CDM Executive Board: Attachment A to the Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities": Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activities. Version 06 of 30 September 2005.

/26/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10

/27/ Tool to determine project emissions from flaring gases containing methane

/28/ Financial analysis PDD 2 spreadsheet.

/29/ Pictures of the farms provided by the project participant.

Main changes between the version of the PDD published for the 30 days stakeholder consultation period and the final version of the PDD are as follows:

- More explanation on the Investment Barrier;
- Changes related to the CARs and CLs identified in the DNV's draft validation report.

3.2 Follow-up Interviews with Project Stakeholders

On 07 November 2008, DNV visited and assessed the Sitio São Benedito swine farm where the biodigester and monitoring and flaring system was implemented. In addition, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. As part of these interviews, DNV reviewed pictures of the anaerobic open lagoons of the others farms included in PDD, where project implementation had not yet started, in order to verify that the current manure management practise is open anaerobic lagoons with depths greater than 1 meter.

The following representatives of the project participants were interviewed:

/30/ David Garcia – Ecoprogresso

/31/ Luiz Lasas – Brascarbon

/32/ Antonio Ianni – Sitio São Benedito

The main topics of the interviews are summarized in the table below.

Organization	**Topic**
Ecoprogresso	• Additionality of the project • Monitoring plan • Baseline emission estimation
Brascarbon	• Historic average swine population • Environmental Licenses/legal compliance • Stakeholders consultation process
Sitio São Benedito BCA-006SP2-02	• Baseline scenario (open anaerobic lagoon) • Project implementation (biodigester) • Operation and monitoring control (procedures)

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the 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 the figure below. The completed validation protocol for the "BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM 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) CDM and/or methodology specific 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.

A request for clarification (CL) 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***
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.

Validation Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.	*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 c**orrective 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 and Clarification Requests			
Draft report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Validation conclusion***
If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the CAR or CL 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

3.4 Internal Quality Control

The validation report underwent a technical review before being submitted to the project participants. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

4 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 project design documentation of 16 March 2009 /2/.

4.1 Participation Requirements

Brascarbon Consultoria, Projetos e Representação Ltda is the project proponent from the Host party Brazil and Luso Carbon Fund of Portugal are participating on behalf of Portugal as Annex I Party. The host Party Brazil and the Annex I Party Portugal meet all relevant participation requirements of CDM project activity. Brazil has ratified the Kyoto Protocol on 23 August 2002 and Portugal on 31 May 2002. The Brazilian designated national authority for the CDM is the Comissão Interministerial de Mudança Global do Clima. The Portuguese DNA is the Casa do Ambiente e do Cidadão, Ministry of Environment, Spatial Planning and Regional Development.

Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.

4.2 Project Design

The “BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil” consists of the implementation of anaerobic digesters in 7 farms located in the São Paulo State, Brazil. The installation of anaerobic digesters aim to treat the manure under controlled conditions as well as capture and burn the methane generated by the decay of swine manure from the farms.

The facility drains the overflow, with lower organic matter content, from anaerobic digesters to the existent open lagoon, which stores the effluents. Effluents are normally used for crop irrigation.

The project will only flare the biogas , but in case of favourable conditions at the farms in the future, biogas may also be utilized to generate electricity for own consumption (in accordance with AMS-III.D version 14). Nonetheless, the PDD clearly states that if electricity will be generated, no CERs will be claimed from displacing grid electricity.

The project is expected to bring social, economic, technological and environmental benefits, thus contributing to sustainable development objectives of the Brazilian Government.

The starting date of the project activity is 10 July 2008, which is the date of signing the Construction contract by Brascarbon and Tercel Terraplanagem for the farms Passagarda, Felicidade and Anália Franco /5/. DNV has verified the documents and considers that the choice of starting date is appropriate and in line with the guidelines of EB 41. The project has an expected operational lifetime of 21 years.

A 7-years renewable crediting period is selected (with the potential of being renewed twice), starting from 01 September 2009 or the date of registration project activity with an expected operational lifetime of 21 years.

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

Although the project participant has other small scale projects with the same methodology, all farms included in these projects are at a distance of more than 1 km from the sites included in this project. The project includes farms in São Paulo State, at the municipalities of Boituva, Itu, Capivari and Capela do Aldo, and no other farms from the other PDDs are located in the same municipalities. Hence, the project is not a de-bundled component of a larger project activity.

4.3 Baseline Determination

The project applies the simplified baseline methodology for selected small-scale CDM project activity AMS-III.D version 14 – "*Methane recovery in animal manure management systems*".

The project meets the applicability criteria of AMS-III.D version 14 as it is demonstrated that:

- The project activity recovers methane generated in the treatment of swine manure by installing methane recovery and combustion systems. The environmental legislation of Brazil does not permit discharge of effluent from swine farms to the water bodies. The usual practice is to use the anaerobic open lagoon with methane emissions escaping to the atmosphere;
- The livestock population in the 7 farms is managed under confined conditions. This was verified through reviewing the environment impact assessment /11/;
- Manure or effluents generated after treatment in the anaerobic bio-digesters is not discharged into natural water resources. This was verified through reviewing the, applicable environment legislation /21/ and the environment impact assessment /11/;
- The annual average temperature of baseline site (São Paulo State) is 23 – 25 °C and hence higher than the methodology stipulated temperature of 5°C. This was verified through information available on Embrapa web site /14/;
- The retention time of waste in the anaerobic open lagoons has been demonstrated to be greater than 1 month, as verified through environmental impact assessment /11/. The depth of the open lagoons is greater than 1 meter, as verified through the site visit at the Sitio São Benedito swine farm and pictures provided by the project participant for the remaining sites /29/;
- No methane recovery and destruction by flaring, combustion or gainful use takes place in the baseline scenario as verified by pictures provided by the project participant for all farms /29/;
- The project involves facilities to burn (flaring) all biogas generated by the digester;
- The estimated emissions reductions of 45 146 tCO_2e are lower than the limit 60 kt CO_2 equivalent /3/;
- The project involves the use of treated effluent for irrigation in farms and application of stabilized sludge on crops irrigation in farms, without any anaerobic conditions. The practice is to distribute the sludge over the field according the usual practice to improve the fertilization to the crop, as verified during the site visit at the Sitio São Benedito swine farm and based on DNV's experience with swine production in Brazil. This is the only possible application to the use of effluent and stabilized sludge for crops irrigation, since

to drain the effluent into a river is not in compliance with environmental regulations and the effluent is a good fertilizer for crop.

In the absence of the CDM project activity, the existing facility would continue to emit methane to the atmosphere at historical average levels.

In Brazilian swine farms, the environment legislation restricts discharging the manure into the water bodies. The common practice is to use anaerobic open lagoon, since the cost of biodigester is very high for swine farmers. The swine farmers therefore prefer to invest in increasing swine production, rather than in a project for capturing and destroying the methane gas.

The baseline is the emissions of methane from anaerobic decay of swine manure, calculated in accordance with the most recent IPCC tier 2 approaches (IPCC 2006 Guidelines). The IPCC default values for the parameters B_0 and VS were applied for Western Europe /7/. This is adequate as the main races used in Brazil for industrial purposes /9/ are of Western European bread due to the easy management and high quality of meat, as described by Brazilian Association for Swine Culture /18/ and as verified trough reviewing the receipts /6/ for sow purchase from Agrocerespic, the Brazilian joint venture from Agroceres and Pig Improvement Co. from UK /9/.

The MCF for open lagoon and ambient temperature for Brazil South and Southeast has been chosen according to Embrapa for São Paulo State annual average temperature /14/.

The project is designed to be independent concerning electricity consumption. The biogas flow meter selected was thermal mass in order to avoid pressure and assure the maximum flow. The electronic monitoring control system is supplied from solar panel and battery.

The project boundary includes the GHG emissions that come from the animal waste practices, including the GHG resulting from the capture and combustion of biogas.

4.4 Additionality

The additionality of the project is demonstrated by applying requirements stipulated in the Attachment A to the Appendix B of the simplified modalities and procedures for CDM small-scale project activities.

4.4.1 CDM consideration and continued action to secure CDM status

The serious consideration of CDM prior to project start and subsequent real actions are evidenced by the Letter of Intent dated 01 June 2007 **/10/** signed between Ecoprogresso and Brascarbon for purchasing the emissions reductions from methane avoidance of swine manure projects which clearly demonstrates that CDM has been considered prior to the decision to go ahead with the project.

The starting date of the project activity was 10 July 2008, the date of signing the construction agreement//5/. The validation started on 27 August 2008 when the PDD was published for global stakeholder consultation. At the time of completion of the validation report, the biodigester had concluded the construction as evidenced by the construction schedule /12/.

4.4.2 Investment barriers

In Brazil, there are 700 000 swine farmers and only 2 000 with biodigester /18/. All the biodigesters in swine farms are being developed only as CDM projects /19/. There are currently no direct subsidies or promotional support for the implementation of manure management or capture and destroying biogas. As there are higher costs required to install

biodigesters and flare /15/, than what would be represented by the baseline scenario, the project faces investment barriers compared with the usual practice of open anaerobic lagoons.

- Identification of alternatives to the project activity

  Three alternative baseline scenarios to the project activity have been suitably identified and discussed.

  Scenario 1: Installation of an anaerobic digester plus flare;

  Scenario 2: Electricity cogeneration and anaerobic digester plus flare installation;

  Scenario 3: Installation of the open anaerobic lagoons (baseline scenario).

- Choice of approach

  The project evidences the NPV analyses considering the investment of biodigester and flaring installation and O&M for scenario without and with generation of electricity with biogas. All farms were analyzed proportionally to the swine population and consequent biodigester size.

- Benchmark selection

  The basis for the discount rate is the SELIC rate set by the Central Bank of Brazil (http://www.bcb.gov.br) /20/. The chosen discount rate considered of 12.75% for 21 years represents the average SELIC rate (average from 2007), when the project participant decided to implement the project.

- Input parameters

  DNV has compared the main input parameters used in the financial analyses with the data reported for other similar projects recovering methane in animal manure management systems in Brazil (investment costs, applicable electricity tariff and operation and maintenance costs (O&M)). The assumed investment for the electric generator and the price of electricity saved was verified by comparing the values with similar electric generator implemented in similar swine manure project in Brazil and the electricity price was further cross-checked with commercial price of electricity in Brazil **/17/**. In addition to this, based on sectoral competence, DNV confirms that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.

- Calculation and conclusion

  The NPV calculations summarised in the PDD were provided in a excel spreadsheet /28/. The simple cost analysis considered for the scenario of simple capture and flaring demonstrated that the project has negative result.

  For the scenario where the swine farm implements an electricity generator to supply the internal demand, the project involves an average investment above US$ 200 000. The NPV analysis of the implementation of methane recovery system in the farms encompassed by the project demonstrates that such an investment is not financially attractive.

  The NPV values calculated with a discount rate of 12.75% indicate a negative NPV value as showed in the table below.

Farm/Site	*Scenario 1: Digester + flare*	*Scenario 2: Digester + flare + cogeneration*	*Scenario 3: Anaerobic open lagoon*
Sitio das Palmeiras	-268 517.92	-275 502.10	-59 554.47
Sitio São Benedito	-267 453.62	-274 437.80	-48 753.49
Sitio Santo André	-212 109.94	-219 094.12	-39 125.20
Faz. Felicidade - Site 1	-273 351.62	-280 335.81	-51 310.57
Faz. Felicidade - Site 2	-264 704.17	-271 688.36	-50 608.13
Fazenda Passargada - Site 1	-211 489.09	-218 473.,28	-39 456.91
Fazenda Passargada - Site 2	-121 289.54	-128 273.72	-12 881.30

- Sensitivity analysis

  A sensitive analysis considering variations of 10% in the total investments and electricity price demonstrates that the project has still a negative NPV /28/.

  It is thus demonstrated that the project activity is not financially viable and as the open lagoons are complying with environment legislation, the swine farms is not requested to capture and destroy the biogas produced by the decay of manure.

- *Technological barrier*: The implementation of biodigesters instead of open anaerobic lagoons requires special expertise with respect to design of facility, operation and maintenance of flare and operational control of biodigesters (pressure, temperature, flow etc). This expertise is not common with swine farm managers, thus requiring support of external technicians, considering that it is an entirely different activity from swine growing. Hence, the project would not be implemented without external support to overcome the technical difficulties.
- *Barrier Due to Prevailing Practice.* The Brazilian environment legislation requires the swine farms, to implement proper treatment of manure, without discharge into water bodies /21/ and the common practice for treatment of effluents is the open lagoon (esterqueira) which could avoid the water pollution and also produce fertilizer to be used on the crops /18//19/. The use of biodigester is not common due to the high investment and the specific skill needed for its operation and maintenance as the anaerobic process to produce gas need proper chemical and biological control which is not commonly available among swine farm operators. This was verified during several verifications carried out by DNV in Brazil on implemented swine manure projects.

Given the above barriers, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions thus are additional to what would otherwise have occurred.

4.5 Monitoring

The project applies the approved monitoring methodology AMS-III.D (version 14) "*Methane recovery in animal manure management systems*". Also, monitoring requirements specified in the methodological "*Tool to determine project emissions from flaring gases containing methane*" /27/.

According to AMS-III.D version 14, the monitoring consists of direct measurement of the amount of methane flared or fueled, and concerning leakage, no sources of emission were identified.

4.5.1 Parameters monitored ex-ante

According to AMS-III.D version 14, the baseline emissions are calculated ex ante considering the estimated swine population hosted by each farm, and respective default values of MCF, VS and B_0 according to the 2006 IPCC Guidelines.

The parameters used for the emission reduction calculations that are available *ex ante* and listed in PDD include:

- Default of daily volatile solid excreted for livestock category T as IPCC 2006 (Vs);
- Methane conversion factor for management system S, climate region K ($MCF_{S,K}$) considering the temperature for southwest region /14/;
- Maximum methane production (B_0) according Western Genetic as IPCC 2006 and considering the Agroceres genetic source /9//6/ used by swine producers /6/;
- Default average animal weight of a defined population at the project site ($W_{default}$) considering market swine as 50kg and breeding swine 198 kg, according IPCC 2006 and Western Europe genetic /9//6/;

4.5.2 Parameters monitored ex-post

Emission reduction calculations are transparently documented in accordance with AMS-III.D (version 14), and will be monitored and calculated ex-post. The data will be archived in electronic form and be kept for five years after the end of the last crediting period.

The parameters used for the emission reduction calculations that are available *ex post* and listed in PDD include:

- Combustion temperature of the flare (Tf), according to Monitoring Operational Procedure POP-01, which will be measured through the continuous temperature registration in the programmable logic controller (PLC);
- Inspection on the site considering relevant regulation and the infrastructure of the site according to Operational Procedure POP-02;
- Swine population (NLT,y) according to Monitoring Operational Procedure POP-03;
- Average swine weight (Wsite) according to Operational Procedure POP-16;
- Biogas flared or used as a fuel in the year y (BG burnt,y) according to Monitoring operational procedure POP-04.The project specifies the biogas produced will be measured by cumulative flow meter and reported monthly by the regional technician;

- Fraction of methane in the biogas (WCH4,y) be measured through Gem2000/Landtec /8/ at frequency established according statistical analyses in order to assure 95% confidence level according Monitoring operational procedure POP-05;
- Temperature of the biogas at ambient conditions (T_{biogas}) be measured through Gem2000/Landtec /8/ according Monitoring operational procedure POP-06;
- Pressure of the biogas at atmospheric conditions (P_{biogas}) be measured through Gem2000/Landtec /8/ according Monitoring operational procedure POP-06, where the capture system of biogas from swine manure will operate without blower, and the biogas will be the measured at atmospheric pressure (1013 mb);
- Density of the methane combusted at room temperature and 1013 mbar pressure (D CH4,y) according Monitoring operational procedure POP-07;
- Sludge soil application (Q_{DM}) according Monitoring operational procedure POP-09;
- Selection of the correct default Flare Efficiency (FE or ηflare, h) according to the combustion temperature of the flare (Tf) and Monitoring Operational Procedure POP-010 applying the programmable logic controller (PLC) which at flare operation above 500ºC will select a 90% flare efficiency and otherwise 50% flare efficiency;
- Comparison of the baseline with the actual measured data (ERy,ex-post) according to the operational procedure POP-17;
- Formulated Feed Rations (FFR) according operational procedure POP-18;
- Genetic source from annex I party according operational procedure POP-15;
- Fraction of manure handled in project emissions in system “i”, year “y” monitored through the annex attached at the operational procedure POP-02.
- Volumetric flow rate of the residual gas in dry basis at normal conditions in hour h according to the operational procedure POP-04;
- Mass flow rate of methane in the residual gas in the hour h calculation, calculated according instruction on operational procedure POP 17;
- Volumetric fraction of methane content in the residual gas on dry basis, measured at a frequency that will ensure a 95% confidence level, according operational procedure POP-05;
- Number of animals produced annually of type “LT” in year “y” and Number of days animal is alive in the farm, in year “y”, according operational procedure POP-03 and computer system Pig-Champ or equivalent /9/;
- Electricity consumed from the grid by the project (kWh), although the design of biodigesters facilities is for autonomous operation, the project will measure possible electricity consumed if occurred.

The monitoring approaches are considered appropriate and effective and comply with AMS-III.D (version 14).

4.5.3 Management system and quality assurance

Responsibilities and authorities for project management, monitoring and reporting activities, measurement, training and reporting techniques and QA/QC procedures are defined. In addition, it was verified that Brascarbon, as responsible for operation of biogas capture and

flaring and for the monitoring, have enough resources and skills to assure adequate operation and monitoring of the biodigesters and the biogas capture and flaring system.

Several operational procedures were implemented in order to assure adequate operation and monitoring /13/.

4.6 Estimate of GHG Emissions

Emission reduction calculations are transparently documented in the spreadsheet /3/, in line with AMS-III.D version 14 as follows:

$$ER_y = BE_y - PE_y - L_y$$

Therefore, the emission reductions of the proposed project are estimated as follows:

- $\boldsymbol{BE_y = GWP_{CH4} * D_{CH4} * UF_b * \sum MCF_j * B_{o.LT} * N_{LT.y} * VS_{LT.y} * MS\%_{BL.J}}$

Baseline emissions consider the IPCC 2006 Tier 2 approach and applicable default values as defaults values of Tables 10A-7 10A-8 /26/

The Baseline emissions consider the factor $MS\%_{BI,j}$ as 100% of the manure will be handled per category T, system S and climate region k and on project emissions consider the MS% i,y as 90% of the manure be handled in system "i".

- $PE_y = PE_{PL.y} + PE_{flare.y} + PE_{power.y}$

The project emissions were calculated considering (a) the physical leakage from the system as 10% of maximum methane producing potential of the manure, (b) emission from flaring considering a default value of 90% for efficiency of flaring according to the "Tool to determine project emissions from flaring gases containing methane" /27/ and (c) emissions from electricity for the operation of the installed facilities.

No leakage effects are required to be considered for the project activity as per the methodology. Hence leakage is taken as zero, $L_y = 0$.

The estimated amount of GHG emission reductions from the project is 316 022 tCO_2e during the first crediting period (7 years).

The baseline emission estimate can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

4.7 Environmental Impacts

Although São Paulo Environment State Agency does not need to provide environment license for agriculture activities, the project activities will reduce negative environment impacts, like the population of flies, possible spread of disease and odor. **/11/**.

4.8 Comments by Local Stakeholders

Local stakeholders, such as the City Hall, the environmental state and local agencies, and local community associations were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The invitation letters and the mail receipts were received from the project proponent. In addition all clarification meetings and

commentaries were verified. All comments were about the specific technical issues and supporting the project.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of 01 May 2008 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 28 August 2008 to 26 September 2008. No comments were received.

APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion
About Parties		
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	Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. 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	Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.
4. 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	Prior to the submission of the final validation report to the CDM Executive Board, DNV will have

Requirement	Reference	Conclusion
		to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.
5. 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	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	The Brazilian designated national authority for the CDM is the Comissão Interministerial de Mudança Global do Clima. The Portuguese DNA is the Casa do Ambiente e do Cidadão, Ministry of Environment, Spatial Planning and Regional Development.
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	Brazil has ratified the Kyoto Protocol on 23 August 2002. Portugal has ratified the Kyoto Protocol on 31 May 2002.
8. 8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	Portugal calculated and recorded its assigned amount units.
9. 9. The participating Annex I Party shall have in place a national system for	CDM Modalities and	Portugal has in place a national

Requirement	Reference	Conclusion
estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	Procedures §31b	registry and reported in June 2006 their 4th communication.
About additionality		
10. 10 Reduction in GHG emissions shall be additional to any that would occur in the 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	Table 2, Section B.3.1
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	Table 2, Section B.4 to B.7
For large-scale projects only		
12. 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	Table 2, Section D.
About small-scale project activities (if applicable)		
13. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	Table 2, Section A.5.
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	Table 2, Section A.5.

Requirement	Reference	Conclusion
15. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	Table 2, Section D.
About stakeholder involvement		
16. 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	Table 2, Section E.
17. 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	The PDD of 01 May 2008 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 28 August 2008 to 26 September 2008. No comments were received until no.
Other		
18. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	Table 2, Section B.1.1 and D.1.1
19. 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	Table 2, Section B.2
20. 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	Table 2, Section B.2
21. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B,	The project design document conforms to version 03 of the

Requirement	Reference	Conclusion
	EB Decision	CDM-SSC-PDD.
22. 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	Table 2, Section D

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	**/1/**	DR	The project activity is located in the São Paulo State, Brazil.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	**/1/**	DR	The project boundary is defined as the project boundary considers the GHG emissions that come from the animal waste practices, including the GHG resulting from the capture and combustion of biogas, in accordance with AMS-III.D version 14.		OK
A.2. Participation Requirements *Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.*					
A.2.1. Which Parties and project participants are participating in the project?	**/1/**	DR	The Project participants are Brascarbon Consultoria, Projetos e Representação Ltdaof Brazil MDL (Project implementation company) and Luso Carbon Fund (Shareholder of Climate Change Capital Limited) of Portugal. The host Party Brazil and the Annex I Party Portugal meet all relevant participation requirements.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	**/1/**	DR	Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.	–	--
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	**/1/**	DR	Yes, Brazil and Portugal fulfil all requirements of participation. Brazil has ratified the Kyoto Protocol on 23 August 2002. The Brazilian DNA is the Comissão Interministerial de Mudança Global do Clima. Portugal has ratified the Kyoto Protocol on 31 May 2002. The Portuguese DNA is the Casa do Ambiente e do Cidadão, Ministry of Environment, Spatial Planning and Regional Development.		OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	**/1/**	DR	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.		OK
A.3. Technology to be employed *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.*					

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.1. Does the project design engineering reflect current good practices?	**/1/**	DR	The installation of anaerobic digesters aim to treat the manure under controlled conditions as well as to capture and burn the methane generated by the decay of swine manure from the farms. The facility drains the overflow with lower organic content to the existing open lagoon, which stores the effluents. Effluents are normally used for crop irrigation. The project will flare the biogas, but in case of favourable conditions at the farms in the future, the biogas may be utilized to also generate electricity for own consumption as paragraph 8 of AMS-III.D version 14. However, it is not clear if the project will claim CERs from this electricity.	~~**CL 2**~~	OK
A.3.2. 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	The implementation of biodigester instead of open lagoon needs special skills with respect to design of the facility and operation and maintenance of flare and operation control (pressure, temperature, flow etc). This skill is not common for swine farm managers and need support of external technicians. The project uses current available technology in the country for methane capture and destruction, however it is possible some farms want to invest to implement an electric generator to produce electricity to own consume. With regards to the electricity generation, the content of H_2S on biogas arouses severe corrosion on equipment,		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			which needs the installation of specific filter and routine maintenance in order to assure the necessary lifetime of equipment.		
A.3.3. Does the project make provisions for meeting training and maintenance needs?	**/1/**	DR	Brascarbon have enough resources and skills to assure adequate operation and monitoring of the biodigesters and the biogas capture and flaring system. The follow procedures were implemented in order to assure adequate operation and monitoring: POP 1 COMBUST. TEMPERATURE MONITORING Tf POP 2 RULES OF TOWN POP 3 SWINE POPULATION COUNTING POP 4 BIOGÁS VOLUME MEASURING BG_{burnt} POP 5 METHANE CONTEND MONITORING W_{CH4} POP 6 BIOGÁS TEMPERATURE MONITORING POP 7 METHANE DENSITY - DCH4 POP 8 FLARE EFFICIENCY TIMETABLE FEY POP 9 BIODIGESTOR SLUDGE REMOVAL POP 12 GENERAL MAINTENANCE POP 13 SWINE WHEIGT POP 14 SWINE FEED FORMULATION POP 15 GENETIC SOURCE POP 16 AVERAGE ANIMAL WEIGHT POP 17 YEARLY EMISSION REDUCTION EX-POST		OK
A.4. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	**/1/**	DR	Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the	—	--

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.		
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	**/1/**	DR	The project is expected to bring social, economic, technological and environmental benefits, thus contributing to sustainable development objectives of the Brazilian Government.		OK
A.5. Small scale project activity *Tit is assessed whether the project qualifies as small-scale CDM project activity*					
A.5.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	**/1/**		The project applies the simplified baseline methodology for selected small-scale CDM project activity (AMS-III.D version 14) – "*Methane recovery in animal manure management systems"*		OK
A.5.2. Is the small scale project activity not a debundled component of a larger project activity?	**/1/**		Although the project participant has other small scale projects with the same methodology, all those farms are at a distance more than 1 km from the project activity. Hence the project is not a de-bundled component of a larger project activity.		OK
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate*					

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
baseline methodology.					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	**/1/**	DR	The project applies the simplified baseline methodology for selected small-scale CDM project activity (AMS-III.D version 14) – "*Methane recovery in animal manure management systems"*		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	**/1/**	DR	The project meets the applicability criteria of AMS-III.D version 14as it is demonstrated that: - The swine population is managed under confined conditions; - The manure is stored on open lagoon for evaporation, according Brazilian environment legislation, which does not allow discharging of swine manure effluent on water bodies; - The annual average temperature of baseline site is higher than 5C as demonstrated to MCF applicable. - The practice manure storage time is around one year, and the depth of open lagoons is higher than 1 meter in order to support the practice. - The baseline scenario is the open lagoon without any methane recovery. - The project recovers methane generated from the treatment of swine manure by installing methane recovery and		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			combustion systems. The usual practice is to use the anaerobic open lagoon with methane emissions escaping to the atmosphere; - The project involves facilities to burn (flaring) all biogas generated by the digesters. The aggregate emissions reduction by the project activity is 7-years316 022 tCO_2e per year which is lower than the limit of 60 kt CO_2 equivalent per annum, for Type III small scale projects.		
B.2. Baseline Scenario Determination *The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.*					
B.2.1. What is the baseline scenario?	**/1/**	DR	The baseline is the emissions of methane from anaerobic decay of swine manure in open anaerobic lagoons.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	**/1/**	DR	Consideration of alternative scenarios is not required for small scale methodologies.		OK
B.2.3. Has the baseline scenario been determined according to the methodology?	**/1/**	DR	Yes. the baseline scenario been determined according to the methodology AMS IIID version 14.		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	**/1/**	DR	Yes.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	**/1/**	DR	Yes.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	**/1/**	DR	Yes		OK
B.2.7. Have the major risks to the baseline been identified?	**/1/**	DR	Yes.		OK
B.3. Additionality Determination *The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.*					
B.3.1. Is the project additionality assessed according to the methodology?	**/1/**	DR	The additionality of the project is demonstrated by applying the Attachment A to the Appendix B of the simplified modalities and procedures for CDM small-scale project activities. The additionality claims of the project are based on the following barriers: • *Investment barrier*: In Brazil, there are 700,000 swine farmers and only 2,000 with biodigester **/18/**, whereof all biodigesters are implemented as CDM project activities. There are currently no direct subsidies or promotional support		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			for the implementation of manure management or capture and destroying biogas. As there are higher costs required to install biodigesters and flare **/20/**, than what would be represented by the baseline scenario, the project faces investment barriers compared with the usual practice of open anaerobic lagoons. The project evidences the NPV analyses considering the investment of biodigester and flaring installation and O&M for scenario without and with generation of electricity with biogas. All farms were analyzed proportionally to the swine population and consequent biodigester size. The discount rate considered of 12,75% for 21 years is adequate considering the Brazilian government loan (SELIC) was around 12,75% on 2007 /14/, when the project participant decide implement the project. The operation and maintenance cost reach 16% of investment including beyond the operation, the monitoring and management project costs. As evidenced, all farms have a negative result with biodigester and electricity generator implementation justified mainly by the high investment of biodigester and electricity generator and low profit when use		

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			proper electricity or even null when only the capture and flaring activity is implemented. Hence, it is sufficiently demonstrated that the project faces an investment barrier. • *Technological barrier*: The implementation of biodigesters instead of open anaerobic lagoons requires special expertise with respect to design of facility, operation and maintenance of flare and operation control (pressure, temperature, flow etc). This expertise is not readily available with the swine farm managers, thus require support of external technicians considering the different activity from swine growing. This argument is validated by DNV on the basis of experience in similar swine farms in Brazil. • *Barrier Due to Prevailing Practice.* The Brazilian environment legislation require swine farm activities to have proper treatment system for manure, without discharge it into water bodies. The common practice for treatment of effluent is the open lagoon (esterqueira) which could avoid the water pollution and also could produce fertilizer to be used on the crops. In Brazil, there are 700,000 swine farmers and only 2,000 with biodigester. The use of biodigester is not common due		

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			its high investment and the specific skill required as the anaerobic treatment system to produce gas involve the chemical and bacterial control which is not common on swine farmers.		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	**/1/**	DR	See B.3.1.		OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	**/1/**	DR	See B.3.1.		OK
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	**/1/**	DR	The project proponent is requested to provide documentary evidence of the starting date of the project as the earliest of implementation, construction and real action in line with the guidelines of EB 41. Evidence also needs to be provided for serious consideration of CDM while deciding to proceed with the project	~~CL 1~~	OK
B.4. Calculation of GHG Emission Reductions – Project emissions *It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	**/1/**	DR	The project emissions were calculated considering the emission from the system as 10% of baseline emissions and the flare efficiency of 90% according the *"Tool to*		

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			determine project emissions from flaring gases containing methane" As the project will not use blowers and the pumps will be fuelled with biogas, no electricity will be consumed by the farms. As the PDD declare "*The treated water is then recycled and sent back to the farms, or used for irrigation by the use of biogas or electrical stationary pumps*" DNV request to explain in PDD why project emission on account of use of electricity for operation of the facility is not considered in the farms	~~**CL 4**~~	OK
B.4.2. Have conservative assumptions been used when calculating the project emissions?	**/1/**	DR	See B.4.1.		OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	**/1/**	DR	See B.4.1.		OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions *It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	**/1/**	DR	Emission reduction calculations are transparently documented by the spreadsheet **/3/**, and it is in line AMS-III.D version 14. Baseline emissions consider the IPCC 2006 Tier 2 approach and applicable default values		

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			as defaults values of Tables 10A-7 10A-8 however the following need to be justified. (a) As per Serial no 13 of methodology, the Bo & VS values applicable to developed country can be used subject to satisfying four conditions related to genetic source of production, use of formulated fed rations and project specific animal weight. Farm records to demonstrate that these conditions are satisfied at the project sites need to be provided, including genetic source Also justification to be provided for MCF value of 79 % and MS % $_{BL,j,}$ value of 100% & MS% i,y values of 90%$_{y}$ used in ex-post emission reduction calculation	~~CAR 1~~	OK
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	**/1/**	DR	See B.5.1.		OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	**/1/**	DR	See B.5.1.		OK
B.6. Calculation of GHG Emission Reductions – Leakage *It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a	**/1/**	DR	No leakage is applicable under the methodology.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
complete and transparent manner?					
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	**/1/**	DR	See B.6.1.		OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	**/1/**	DR	See B.6.1.		OK
B.7. Emission Reductions *The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.*					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	**/1/**	DR	The project is expected to reduce CO_2 emissions to the extent of 316 022 tCO_2e during the 7-years crediting period.		OK
B.8. Monitoring Methodology *It is assessed whether the project applies an appropriate monitoring methodology.*					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	**/1/**	DR	The approved monitoring methodology (AMS-III.D version 14) –"*Methane recovery in animal manure management systems"*, has been used. As per the monitoring requirements of AMS.III.D, version 14 and the methodological tool to determine project emissions from faring of gases containing methane, the following need to be included in the Monitoring Plan: (i) Manufactures specification for operation	~~**CAR 2**~~	OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			of the flare and the data and procedures to monitor is to be documented in PDD,(Refer serial No 26 of methodology and the methodological Tool to determine project emissions from flaring.) (ii)The system used for monitoring MS% i,y,", and,W_{site} & $N_{LT,y}$ are to be described in PDD (as serial no.30 of AMS.IIID Version 14.). (iii) The genetic source of the livestock needs to be monitored. (as serial no 31(a) of Methodology). (iv) Onsite inspection of each farm for each verification period needs to be included. .(as serial no 33 of Methodology). (v) Determination of hourly mass flow rate of methane in the residual gas (TMRG,h) for arriving flare efficiency (refer Step 5 & 6 of Tool) and monitoring of FVRG,h is not specifically included in the parameters to be monitored In addition, the PDD shall document the type of Flare (Open/closed) and the approach to determine flare efficiency. Since the PP is using default value for methane destruction efficiency, PDD shall document that manufacturer's specifications for the operation of the flare and the required data and procedures to monitor these		

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			specifications. Further, PDD needs to state that if any of the flare parameters are out of range, only 50% of default value shall be used for that hour. The monitoring of $MS\%_{iy}$, nd_y, Genetic source of the livestock and other Flare operating parameters needs to be included in the monitoring plan, as per requirement of methodology. Monitoring of $N_{da,y}$ and $N_{p.y}$ also needs to be included in the monitoring plan and procedure for $N_{LT,y}$ determination clearly stated in the PDD. The procedure for W_{site} given in the monitoring plan is *Archive electronically + files, during project plus 5 years.* Procedure for the same shall be clearly identified in the PDD.		
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	**/1/**	DR	All data will be kept until five years after the end of the crediting period.		OK
B.9. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the	**/1/**	DR	The project emissions were calculated considering the emission from the system as 10% of baseline emissions and 90%	~~**CL 5**~~	OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
greenhouse gas emissions within the project boundary during the crediting period?			efficiency of flare, according the "*Tool to determine project emissions from flaring gases containing methane"* /9/. The temperature of flare combustion will be measured on time of gas flaring. An installed PLC will assure the temperature above 500ºC all the time of flaring. In case this temperature comes down, the PLC will close the exhaust valve. Records will be available on local PLC or computer data base. The following need to be included in the Monitoring Plan. (i) Manufactures specification for operation of the flare and the data and procedures to monitor is to be documented in PDD, as required under the methodological "*Tool to determine project emissions from flaring"*. Also see serial No 26 of methodology. (ii)The system used for monitoring MS% i,y,", and,W_{site} & $N_{LT,y}$ are to be described in PDD(see serial no.30 of AMS.III.D,Version 14.). (iii) The genetic source of the livestock need to be monitored.(see serial no 31(a) of Methodology). (iv) Onsite inspection of each farm for each verification period need to be included. .(see serial no 33 of Methodology). (v)Determination of hourly mass flow rate of		

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			methane in the residual gas ($TM_{RG,h}$) for arriving flare efficiency (refer Step 5 & 6 of Tool) and monitoring of $FV_{RG,h}$ is not specifically included in the parameters to be monitored		
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	**/1/**	DR	See B.9.1		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	**/1/**	DR	See B.9.1		OK
B.9.4. Is the measurement equipment described and deemed appropriate?	**/1/**	DR	See B.9.1		OK
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	**/1/**	DR	See B.9.1		OK
B.9.6. Is the measurement *interval* identified and deemed appropriate?	**/1/**	DR	See B.9.1		OK
B.9.7. Is the *registration, monitoring, measurement* and *reporting* procedure defined?	**/1/**	DR	See B.9.1		OK
B.9.8. Are procedures identified for *maintenance* of monitoring equipment and installations? Are the calibration intervals being observed?	**/1/**	DR	See B.9.1		OK
B.9.9. Are procedures identified for day-to-day records	**/1/**	DR	See B.9.1		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
handling (including what records to keep, storage area of records and how to process performance documentation)					
B.10. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.*					
B.10.1. 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	According to AMS-III.D version 14, the baseline emissions are calculated ex ante considering the estimated swine population hosted by each farm, and respective default values of MCF, VS and B_0 according to the 2006 IPCC Guidelines. However these figures were not justified. See B.5.1 and B.8.1	~~**CAR 1**~~	OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	**/1/**	DR	See B.10.1		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	**/1/**	DR	See B.10.1		OK
B.10.4. Is the measurement *equipment* described and deemed appropriate?	**/1/**	DR	The measurement equipments used for the monitoring purposes is identified and the applicable procedures established. See A.3.3		OK
B.10.5. Is the measurement *accuracy* addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	**/1/**	DR	The measurement accuracy is addressed for the various parameters. Procedures to deal with erroneous measurements were		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			established. See A.3.3		
B.10.6. Is the measurement *interval* for baseline data identified and deemed appropriate?	**/1/**	DR	See B.10.1.		OK
B.10.7. Is the registration, *monitoring, measurement* and *reporting* procedure defined?	**/1/**	DR	Procedures for the registration, monitoring, measurement and reporting of the parameters in the monitoring plan were identified. See A.3.3		OK
B.10.8. Are procedures identified for *maintenance* of monitoring equipment and installations? Are the calibration intervals being observed?	**/1/**	DR	Procedures for maintenance of the monitoring equipments and installations and the calibration frequency were identified. See A.3.3		OK
B.10.9. 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	Procedures for day-to-day record handling, collection and archiving were identified. See A.3.3		OK
B.11. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	**/1/**	DR	Concerning leakage, no sources of emission were identified according to AMS-III.D version 14		OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	**/1/**	DR	See B.11.1.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	**/1/**	DR	See B.11.1.		OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	**/1/**	DR	The simplified monitoring methodology AMS-III.D version 14 and the Brazilian DNA do not require the monitoring of social and environmental indicators.		OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	**/1/**	DR	See B.12.1		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	**/1/**	DR	See B.12.1		OK
B.13. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
B.13.1. Is the authority and responsibility of overall project management clearly described?	**/1/**	DR	Yes.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.13.2. Are procedures identified for training of monitoring personnel?	**/1/**	DR	Procedures for identification of training for the monitoring personnel is addressed in the PDD. See A.3.3		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	**/1/**	DR	Emergencies procedure has been identified with respect the leak of biogas on biodigester under the POP 12 GENERAL MAINTENANCE		OK
B.13.4. Are procedures identified for review of reported results/data?	**/1/**	DR	Procedures for review of reported results/data and for corrective actions in order to provide more accurate future monitoring and reporting were established. See A.3.3		OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	**/1/**	DR	See A.3.3		OK
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	**/1/**	DR	The project starting date was on 10 July 2008 with an expected lifetime of 21 years. The project proponent is requested to provide documentary evidence of the starting date of the project as the earliest of implementation, construction and real action in line with the guidelines of EB 41.	~~CL 1~~	OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
C.1.2. Is the start of the crediting period clearly defined and reasonable?	**/1/**	DR	A 7-years renewable crediting period is selected (with the potential of being renewed twice), starting on 01 September 2009 or the date of registration project activity.		OK
D. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
D.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	**/1/**	DR	Although São Paulo Environment State Agency don't provide environment license for agriculture activities, the project activities will reduce the environment impacts, like the population of flies, possible spread of disease and odor and was taken into account by the project participant in PDD as evidenced on Environment Impact assessment of Brascarbon PDD 2 BCA.BRA.02 submitted to DNV **/11/**.		OK
D.1.2. Does the project comply with environmental legislation in the host country?	**/1/**	DR	See D.1.1.		OK
D.1.3. Will the project create any adverse environmental effects?	**/1/**	DR	See D.1.1.		OK
D.1.4. Have environmental impacts been identified and addressed in the PDD?	**/1/**	DR	See D.1.1.		OK
E. Stakeholder Comments *The validator should ensure that stakeholder comments have been*					

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
invited with appropriate media and that due account has been taken of any comments received.					
E.1.1. Have relevant stakeholders been consulted?	**/1/**	DR	Local stakeholders, such as the City Hall, the environmental state and local agencies, and local communities associations, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. However, according to Resolution 1, the project participants did not invite all the stakeholders. In addition, the project proponent did not identify all stakeholders that have made comments. The letters sent to the local stakeholders, the comments received and how due account was taken were not evidenced. DNV requests a copy of these. Minutes of meeting of stakeholder consultation also needs to be provided.	~~CL 6~~	OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	**/1/**	DR	See E.1.1		OK
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	**/1/**	DR	See E.1.1		OK
E.1.4. Is a summary of the stakeholder comments received provided?	**/1/**	DR	See E.1.1		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.1.5. Has due account been taken of any stakeholder comments received?	**/1/**	DR	See E.1.1		OK

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

Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

A.6. Letter of approval					
A.1.1 Is the LoA received directly from the DNA or through the project participant.	**/1/**	DR	Prior to the submission of the final validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil and DNA of Portugal, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development.	--	--
A.7. Project design					
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	**/1/**		Yes, please see Table 2 A.3.1		OK
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	**/1/**		No. The starting date of the project activity indicated in the PDD is 10 July 2008 the date of signing the Construction contract by Brascarbon and Tercel Terraplanagem on 10 July 2008 for the farms Passagarda, Felicidade and Anália Franco /5/. Please see Table 2 C.1.1		OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	**/1/**		The project is a small scale project. Although the project participant has another small scale project with the same methodology, all farms included in the other projects are located at distances greater than 1 km, hence the project is not a de-bundled component of a larger project activity. On 07 November 2008, DNV performed interviews with project stakeholders to		OK

			confirm selected information and to resolve issues identified in the document review. The project participants of Ecoprogresso and Brascarbon were interviewed during the site visit at the swine farm where the biodigester and monitoring and flaring system was implemented.		
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	**/1/**		No, the entire project will use new equipment. Please see Table 2 A.3.1.		OK
A.8. Project emissions not addressed by the methodology					
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	**/1/**		Yes. Please see Table 2 B.4 and B.5.		OK
A.9. Documentation of baseline emissions					
A.4.1 Documentation of the baseline determination: a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. e. The methodology has been correctly applied to identify what would occurred in the absence of	**/1/**		Yes. Please see Table 2- B.1.1, B.2.1, B.2.2 and B.5.		OK

the proposed CDM project activity					
A.10. Documentation of the calculations					
A.5.1 Algorithms and/or formulae used to determine emission reductions • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.	**/1/**		Yes, Please See Table 2 B.4 and B.5.		OK
A.11. Implementation of the monitoring plan					
A.6.1 How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project by monitored ex-post and verified later by a DOE?	**/1/**		Yes, please see Table 2 B.8, B.9 and B.10.		OK
A.12. CDM consideration prior to starting date					
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46	**/1/**		Yes, Pease see Table 2 B.3.4.		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 1 As per AMS-III.D version 14, the Bo & VS values applicable to developed country can be used subject to satisfying four conditions related to genetic source of production, use of formulated fed rations and project specific animal weight. Farm records to demonstrate that these conditions are satisfied at the project sites need to be provided, including the genetic source. Also justification to be provided for MCF value of 79 % and MS % BLj, value of 100% & MS% i,y values of 90%y used in ex-post emission reduction calculation.	B.5.1	Bo & VS values are adequate to the Brazilian Swine Production due the genetic adopted in the country from western Europe. One of the genetic supplier is Agroceres PIC (www.agrocerspic.com.br), originated in Great Britain. The genetic will be monitored annually according to the new procedure implemented POP 15- Genetic Monitoring. The PDD was revised and documents provided to DNV with this report. Genetic data from project sites will be sent with this report. The animal weight is controlled according to animal conversion feed rate and checked and monitored with the operational procedure POP 16. Information given from swine producers. Nutrition for feed rations are very developed as so as in developing countries to attend the conversion rate in animal feed operations. The POP 18, informed in the PDD Annex 4, will be renamed and changed to POP 14, where formulated feed rations documents are provided from farms.	The PDD version 2 dated 16 March 2009 was correctly revised. Evidences were provided showing that boar and finishers swine were supplied by Agrocered to several swine farms. Together with the information provided on the food formulations, it was confirmed that selecting the factors fro Western European genetics according to the IPCC 2006 is correct. Therefore this CAR is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		The value of MCF of 79% is correct, where the medium temperature in the region where the PDD is located is justified by the table 6.2 in the PDD. The weather site informed in the table is official in Brazil. Also the information can be assessed by the following site: http://satelite.cptec.inpe.br/PCD/ The MS%BLj is 100%, where 100% of the manure will be handled in the baseline, as indicated in the PDD section 6.2. The value of MS% i,y was changed to 100% in the PDD section 6.2, where 100% the manure will also handled in the project	
CAR 2 As per the monitoring requirements of AMS.III.D, version 14 and the methodological tool to determine project emissions from faring of gases containing methane, the following need to be included in the Monitoring Plan: (i) Manufactures specification for operation of the flare and the data and procedures to monitor is to be documented in PDD, (Refer serial No 26 of methodology and the methodological Tool to determine project emissions from flaring.)	B.8.1	(i)Sent evidence to DNV Brazil with this report. (ii) description included in the PDD in the section B.7 (iii)The genetic is monitored annually according to the operational procedure adopted and included in the PDD Annex 4 – POP 15. (iv) The PDD shows the inspection activity	The revised PDD version 2 dated 16 March 2009 and the CERs calculation spreadsheet PDD 2 BASCARBON BC5 BRA Version 14 applies adequate factors according IPCC 2006 and AMS-III.D version 14. Therefore this CAR is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
(ii)The system used for monitoring MS% i,y,", and,Wsite & NLT,y are to be described in PDD (as serial no.30 of AMS.IIID Version 14.). (iii) The genetic source of the livestock needs to be monitored. (as serial no 31(a) of Methodology). (iv) Onsite inspection of each farm for each verification period needs to be included. .(as serial no 33 of Methodology). (v) Determination of hourly mass flow rate of methane in the residual gas (TMRG,h) for arriving flare efficiency (refer Step 5 & 6 of Tool) and monitoring of FVRG,h is not specifically included in the parameters to be monitored In addition the PDD shall document the type of Flare (Open/closed) and the approach to determine flare efficiency. Since the PP is using default value for methane destruction efficiency, PDD shall document that manufacturer's specifications for the operation of the flare and the required data and procedures to monitor these specifications. Further, PDD needs to state that if any of the flare parameters are out of range, only 50% of default value shall be used for that hour.		for each site according to the operational procedure detailed POP 2 in the Annex 4. The comments in the table will be changed to on site inspection instead of licenses. (v) The monitoring system adopted to determinate the residual gas is implemented in the operational procedure POP 5 which determines also the concentration of methane in the residual gas fv CH4,RG,h. Included in the tables of the section B.7.1 the monitoring procedure of the residual gas, also in the section B.7.2 and Annex 4. The FV RG,h is monitored according to the operational procedure POP -04 where the volume is monitored. The determination of the TMRG,h is included in the operational procedure POP 17 which also determines the calculation of the project emissions ex-post Also included in the PDD the general description of the flare in the section A.4. Manufactures specification will be sent to DNV Brazil with this report. The parameters of the flare specification to determine the flare efficiency will be controlled by a operational procedure POP	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
The monitoring of MS%iy, ndy, Genetic source of the livestock and other Flare operating parameters needs to be included in the monitoring plan, as per requirement of methodology. Monitoring of Nda,y and Np.y also needs to be included in the monitoring plan and procedure for NLT,y determination clearly stated in the PDD. The procedure for Wsite given in the monitoring plan is Archieve electronically + files, during project plus 5 years. Procedure for the same shall be clearly identified in the PDD.		8 where the hourly temperature is controlled e according to the specification of the flare in the range of 0% to 90%. Details will be included in the PDD section B.7.2. MS% I,y included in the monitoring system POP 2 – site inspection. Included in the table B9 section B.7.2. All parameters to control to determine the NLT,y is included in the PDD section B.7. The Nday,y and the Np,y are controlled with the operational procedure POP 3 where monthly data is collected in each farm. In the table B.9 in the section B.7.2 is clearly defined the archive plan for all monitoring data.	
CL 1 The project proponent is requested to provide documentary evidence of the starting date of the project as the earliest of implementation, construction and real action in line with the guidelines of EB 41.	B.3.4 C.1.1	Brascarbon considers the date of 10/07/2008 as starting date of the project activity, when the first construction started for a pig farm (Passargada, Felicidade and Analia Franco). This is in line with EB41 guidelines. Farms were not completed now with the	The LoI signed by the PP could evidenced the CDM consideration for the project. In addition, complementary information was provided as evidence for the starting date and the intention to implement methane avoidance projects from swine manure management

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		CDM projects, they are still on construction. The CDM decision was taken before the starting date of the project according to the evidence provided to the validator. The evidence to prove the starting date will be sent to DNV Brazil. The document -Relatorio de Impacto Ambiental – sent to DNV Brazil with this report. Time schedule of the project sent to DNV Brazil to prove the continuing the real actions of the CDM status.	systems. As the validation process started on 28 August 2008 continuing and real actions were taken to secure CDM status for the project. Therefore this CL is closed.
CL 2 The project doesn't clarify if the electricity will be generated and if it will be requested for CERs.	A.3.1	Included in the section A.4 the clarification of the no requests for the CER´s generated of the energy produced by the use of the biogas. Also described clearly the system implemented to generate power to the project.	The revised PDD version 2 dated of 16 March 2009 clearly states that possible electricity generated by the farms with the biogas will be not considered to request any CERs of renewable energy. Therefore this CL is closed.
CL 3 According EB 41, a sensitive analysis has to be carried out for the NPV analysis.		Included the sensitive analysis into account in the information already presented in the PDD section B.5.	The revised PDD version 2 dated 16 March 2009 includes the sensitive investment analysis for each farm. The

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			analysis shows that the project activity is always the least attractive scenario. Hence, it is sufficiently demonstrated that the project faces an investment barrier. Therefore this CL is closed.
CL 4 As the PDD declare "The treated water is then recycled and sent back to the farms, or used for irrigation by the use of biogas or electrical stationary pumps. DNV request to explain in PDD why project emission on account of use of electricity for operation of the facility is not considered in the farms.	B.4.1	The declaration in the item A.4 will be revised and clearly explained. The energy to the stationary pumps will be powered by a biogas co-generator. In normal situation the treated water is sent to the pasture by gravity. In the second best choice is the water biogas pumps and the third option in the use of electrical pump powered by a biogas generator.	The reviewed PDD version 2 dated of 01 May 2008 had included the monitoring of possible electricity consumption on each farm. Therefore this CL is closed.
CL 5 The following need to be included in the Monitoring Plan. (i) Manufactures specification for operation of the flare and the data and procedures to monitor is to be documented in PDD, as required under the methodological "Tool to determine project emissions from flaring". Also see serial No 26 of methodology. (ii)The system used for monitoring MS%	B.9.1	(i) It will be explained in the section B.7.2. The flare monitoring is included in the operational procedure POP 8 – flare efficiency. (ii) MS% I,y , Wsite and NLT,y included in the PDD section B.7.2. (iii) A operational procedure POP 15 is implemented to monitor the genetic annually	The reviewed PDD version 2 dated 16 March 2009 and complementary operation procedures submitted to DNV demonstrate the correct Monitoring Plan according AMS-III.D version 14. Therefore this CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
i,y,", and,Wsite & NLT,y are to be described in PDD(see serial no.30 of AMS.III.D,Version 14.). (iii) The genetic source of the livestock need to be monitored.(see serial no 31(a) of Methodology). (iv) Onsite inspection of each farm for each verification period need to be included. (see serial no 33 of Methodology). (v)Determination of hourly mass flow rate of methane in the residual gas (TMRG,h) for arriving flare efficiency (refer Step 5 & 6 of Tool) and monitoring of FVRG,h is not specifically included in the parameters to be monitored		(iv) The farm inspection is at least once a year, according to the POP 2 Site Inspection. Section B.7.1 in the PDD. (v) The mass flow rate is determined in the operational procedure POP 17. The FVRG,h will be included in the POP 5, where the fraction of methane in the biogas and in the residual gas is monitored.	
CL 6 Local stakeholders, such as the City Hall, the environmental state and local agencies, and local communities associations, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. However, according to Resolution 1, the project participants did not invite all the stakeholders. In addition, the project proponent did not identify all stakeholders that have made comments. The letters sent to the local stakeholders, the comments received and how due account was	E.1.1	The copy of letters sent to the local stakeholders, the comments received and how due account was taken will be showed to DNV.	The invitation letters and the mail receipts were received from the PP. In addition all clarification meetings and commentaries were verified. All comments were about the specific technician issues and supporting the project. Therefore this CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
taken were not evidenced. DNV requests a copy of these.			

APPENDIX B

CERTIFICATES OF COMPETENCE

CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Renewables	*Hydro power*	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
	Wind power	Jan 2009	Jan 2009			
	Other renewable	Jan 2009	Jan 2009			
Biomass		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Grid connection of isolated system		Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
Cement		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Waste-heat / waste-gas recovery		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Efficiency of thermal power plants		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Coal mine methane		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Fuel switch		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Manure management		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Waste / wastewater treatment		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Energy efficiency		Jan 2009	Jan 2009		Jan 2009	Jan 2009
N_2O		Jan 2009	Jan 2009		Jan 2009	Jan 2009
HFCs		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Flare reduction		Jan 2009	Jan 2009		Jan 2009	Jan 2009
PFCs		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Charcoal		Jan 2009	Jan 2009		Jan 2009	Jan 2009
CO_2 recovery		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Transport		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Non-renewable biomass		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Biofuel		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Pipeline leakage reduction		Jan 2009	Jan 2009		Jan 2009	Jan 2009
SF_6		Jan 2009	Jan 2009		Jan 2009	Jan 2009

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services

CERTIFICATE OF COMPETENCE

Anu Chaudhary

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas					Jan 2009	Jan 2009
Renewables	*Hydro power*				Jan 2009	Jan 2009
	Wind power					
	Other renewable					
Biomass						
Grid connection of isolated system						
Cement						
Waste-heat / waste-gas recovery						
Efficiency of thermal power plants						
Coal mine methane						
Fuel switch						
Manure management						
Waste / wastewater treatment						
Energy efficiency						
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal						
CO_2 recovery						
Transport						
Non-renewable biomass						
Biofuel						
Pipeline leakage reduction						
SF_6						

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services

CERTIFICATE OF COMPETENCE

Luis Filipe Tavares

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas		Jan 2009	Jan 2009			
Renewables	*Hydro power*	Jan 2009	Jan 2009			
	Wind power					
	Other renewable					
Biomass						
Grid connection of isolated system						
Cement						
Waste-heat / waste-gas recovery		Jan 2009				
Efficiency of thermal power plants						
Coal mine methane						
Fuel switch						
Manure management		Jan 2009	Jan 2009	Jan 2009		
Waste / wastewater treatment		Jan 2009	Jan 2009	Jan 2009		
Energy efficiency						
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal						
CO_2 recovery						
Transport						
Non-renewable biomass						
Biofuel						
Pipeline leakage reduction						
SF_6						

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services

CERTIFICATE OF COMPETENCE

Andrea Leiroz

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*	Jan 2009	Jan 2009			
	Wind power					
	Other renewable					
Biomass		Jan 2009	Jan 2009			
Grid connection of isolated system						
Cement						
Waste-heat / waste-gas recovery						
Efficiency of thermal power plants						
Coal mine methane						
Fuel switch						
Manure management		Jan 2009	Jan 2009			
Waste / wastewater treatment						
Energy efficiency						
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal						
CO_2 recovery						
Transport						
Non-renewable biomass						
Biofuel						
Pipeline leakage reduction						
SF_6						

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services

CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Renewables	*Hydro power*	Jan 2009	Jan 2009		Jan 2009	Jan 2009
	Wind power	Jan 2009	Jan 2009			
	Other renewable	Jan 2009	Jan 2009			
Biomass		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Grid connection of isolated system		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Cement		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Waste-heat / waste-gas recovery		Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
Efficiency of thermal power plants		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Coal mine methane		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Fuel switch		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Manure management		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Waste / wastewater treatment		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Energy efficiency		Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
N_2O		Jan 2009	Jan 2009		Jan 2009	Jan 2009
HFCs		Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
Flare reduction		Jan 2009	Jan 2009		Jan 2009	Jan 2009
PFCs		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Charcoal		Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
CO_2 recovery		Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
Transport		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Non-renewable biomass		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Biofuel		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Pipeline leakage reduction		Jan 2009	Jan 2009		Jan 2009	Jan 2009
SF_6		Jan 2009	Jan 2009		Jan 2009	Jan 2009

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services